Paid Circulation, 26,510

POSTGRADUATE LECTURE COURSE
Boston Medical Library

MARCH 5 – MAY 2

Program – Pages 311-313

The New England Journal of Medicine

FORMERLY THE BOSTON MEDICAL AND SURGICAL JOURNAL — *Established 1828*

VOLUME 244 FEBRUARY 22, 1951 NUMBER 8

Bilateral Thyrotomy for Carcinoma of the Larynx 275
Joseph I. Kemler

Cardiovascular Manifestations in Acute Poliomyelitis 281
Louis Weinstein and Alexis Shelokov

The Analgesic Effect of Dromoran Hydrobromide (3-Hydroxy-N-Methyl Morphinan Hydrobromide) in Postoperative Pain . 286
Erik Keutmann and Francis F. Foldes

Q Fever 288
Francis P. Vose

Massachusetts Medical Society 310, 311

Massachusetts Department of Public Health . 310

Fifty Years of Medical Progress: Medicine as a Social Instrument: Public Health 289
Haven Emerson

Case Records of the Massachusetts General Hospital 297

New Hampshire Medical Society: Proceedings of the One Hundred and Fifty-Ninth Annual Meeting 306

Editorials:

Meeting of the Council. 307

The Training of Interns and Residents. 308

Making Age Less Crabbed. 309

Postgraduate Lecture Course, 1951 310

Book Review 313

Notices 313

Entered as second-class matter, November 16, 1932, at the post office at Boston, Massachusetts, under the Act of March 3, 1879.

1951 Symposia of the MEDICAL CLINICS of NORTH AMERICA

The Medical Clinics are issued in the form of one 300-page volume every other month, with the aim of providing the practicing physician with useful information on subjects of clinical importance. All material is directed toward the postgraduate level and represents the experience of leading American internists. *1951 Symposia* are as follows: March: Nationwide Symposium on *Diseases of the Skin*; May: Symposium from New York City on *Gynecology and Obstetrics*; July: Symposium from the Mayo Clinic on *Renal Disease*; September: Symposium from Boston on *Specific Methods of Treatment*; November: Symposium from Philadelphia on *Diagnosis in General Medicine*.

Medical Clinics of North America. By leading internists. Issued serially, one number of about 300 pages, 6"x9", illustrated, every other month. Sold only by a year of six consecutive numbers. Cloth: $18.00. Paper: $15.00.

W. B. Saunders COMPANY
WEST WASHINGTON SQUARE, PHILADELPHIA 5

May We Suggest You Consult YOUR RADIOLOGIST on All Your X-ray Problems

Does he agree with us ? ? ?

that....1. **fine focus x-ray tubes are necessary for good detail in radiographs**

that....2. **power-plus transformers are necessary for shortest exposures**

For information on new NORTH AMERICAN PHILIPS x-ray apparatus with fine focus tubes and high efficiency transformers

Call or Write

CO 6-7096 CO 6-7096

ATLANTIC X-RAY COMPANY, INC.

909 BOYLSTON STREET
BOSTON 15, MASS.

Better still, COME IN AND SEE the largest selection of x-ray apparatus on display in New England

"You get the biggest x-ray equipment values in Boston HERE"

CASAFRU

A pleasantly *effective laxative*

made from

The Fruit of Senna

(*Cassia acutifolia or Cassia angustifolia*)

extracted and presented in an agreeably sweetened and aromatized, liquid form.

A suitable and efficient laxative for the young or old. Useful in pre- and post-operative cases.

Administration card for the physician's file and clinical sample sent on request.

Mason Drug Company

Boston 18 Massachusetts

C4

NEW BOOKS

GROLLMAN
PHARMACOLOGY & THERAPEUTICS $10.00

HOLLINSHEAD
FUNCTIONAL ANATOMY OF THE LIMBS & BACK $6.00

STORCH
FUNDAMENTALS OF CLINICAL FLUOROSCOPY $6.75

BROWN AND CONNOLLY, INC.
911 BOYLSTON STREET
BOSTON 15

COpley 7-1511

Mail and Phone Orders Promptly Filled

For Members of the Massachusetts, Connecticut, New Hampshire, Rhode Island and Maine Medical Societies ONLY

PROFESSIONAL (MALPRACTICE) LIABILITY INSURANCE

Applications will be provided on request

Policyholder Dividends Since Organization Over $3,000,000

AMERICAN POLICYHOLDERS' INSURANCE COMPANY
209 Columbus Avenue
Boston 16, Mass.
Phone: KEnmore 6-6400

All Children Can Benefit from *this Hot Drink at Breakfast*

The problem of encouraging children to eat an adequate breakfast finds easier solution when Ovaltine in hot milk is recommended as a breakfast beverage. Many children clamor for a hot drink at the morning meal and Hot Ovaltine is the right kind of drink to recommend.

A cup of Hot Ovaltine makes an excellent contribution of virtually all essential nutrients, adding substantially to the nutritional start for the day. It also serves in a gustatory capacity by enhancing the appeal of breakfast and making other foods more inviting.

The nutrient contribution made by a cup of Ovaltine is apparent from the table below. Note the wealth of essentials added to the nutritional intake by making the simple recommendation of adding a cup of Hot Ovaltine to the child's breakfast.

THE WANDER COMPANY, 360 N. MICHIGAN AVE., CHICAGO 1, ILLINOIS

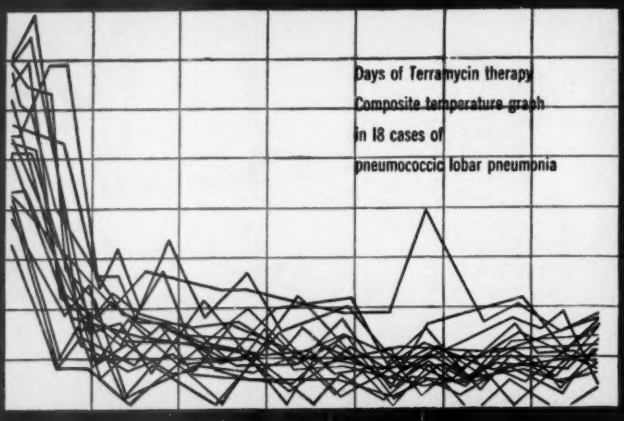
Ovaltine

Here are the nutrients that a cupful of hot Ovaltine, made of ½ oz. of Ovaltine and 8 fl. oz. of whole milk,* provides:

PROTEIN	10.5 Gm.	IRON	4 mg.	NIACIN	2.3 mg.
FAT	10.5 Gm.	COPPER	0.2 mg.	VITAMIN C	10 mg.
CARBOHYDRATE	22 Gm.	VITAMIN A	1000 I.U.	VITAMIN D	140 I.U.
CALCIUM	370 mg.	VITAMIN B_2	0.39 mg.	CALORIES	225
PHOSPHORUS	315 mg.	RIBOFLAVIN	0.7 mg.		

*Based on average reported values for milk.

PNEUMOCOCCIC LOBAR PNEUMONIA



Terra

"With the exception of one subject... there was a dramatic fall in the temperature within twenty-four to thirty-six hours after the first dose of terramycin was given. The major decline in fever occurred during the first twenty-four hours after institution of therapy."

"Improvement in the acute symptoms... usually coincided with the fall in temperature. In many instances... symptomatic improvement actually preceded the fall in temperature."

Maicher, G. W.; Gibson, C. D.; Rose, H. M., and Kneeland, Y.: J. A. M. A. 143:1303 (Aug. 12) 1950.

Antibiotic Division Pfizer

"Excellent" and "dramatic" response

"The response to terramycin therapy was considered excellent in every case and there were no cases in which treatment failed."

Melcher, G. W.; Gibson, C. D.; Rose, H. M., and Knoeland, Y.: J. A. M. A. 143:1303 (Aug. 12) 1950.

Dosage: On the basis of findings obtained in over 150 leading medical research centers, 2 Gm. daily by mouth in divided doses q. 6 h. is suggested for most acute infections.

Supplied: 250 mg. capsules, bottles of 16 and 100;
100 mg. capsules, bottles of 25 and 100;
50 mg. capsules, bottles of 25 and 100.

mycin
HYDROCHLORIDE

Terramycin may be highly effective even when other antibiotics fail.

Terramycin may be well tolerated even when other antibiotics are not.

CHAS. PFIZER & CO., INC.

Relationship of Stress to Autonomic Lability

Studies in psychosomatics have shown that functional disorders often are a result of the patient's inability to adjust to emotionally stressful situations (stressor factors).

Nervous tension and chronic anxiety, discharged through a labile Autonomic Nervous System, can cause somatic disturbance. [1,2] Such states may involve any one of the organ systems or several at one time. [1,2] The outline below is designed to relate gastrointestinal and cardiovascular symptomatology to the exaggerated response of the autonomic nervous system.

	Physiologic Effects of Autonomic Discharge	
	Sympathetic	Parasympathetic
Gastro-intestinal System	Hypomotility Intestinal Atony Hyposecretion Reduced salivation	Hypermotility Gastrointestinal spasm Hypersecretion
Cardio-vascular System	Rapid heart rate Peripheral vaso-constriction	Slow heart rate Vasodilatation
Functional Manifesta-tions	Palpitation Tachycardia Elevated blood pressure Dry mouth and throat	Heartburn Nausea-vomiting Low blood pressure Colonic spasm

The data here tabulated is from references 3,4,5,6,7, given below.

When the clinical picture is suggestive of functional disorder, the diagnosis is supported by the presence of the following indications of autonomic lability:

Variable Blood Pressure
Body Temperature Variations
Changing pulse rate
Deviations in B. M. R.
Exaggerated Cold Pressure Reflex
Oculo-Cardiac Reflex Abnormalities
Glucose Tolerance Alterations

Therapy in these cases is directed toward: 1) relieving the somatic disturbance to prepare the patient for psychotherapy*; 2) guidance in making adjustment to stressful situations and correction of unhealthy attitudes.

*Drug treatment using adrenergic and cholinergic blocking agents in conjunction with sedatives. 8,9,10.

1. Ebaugh, F.: Postgrad. Med. *4:* 208, 1948. 2. Wilbur, D.: J.A.M.A. *141:* 1199, 1949. 3. Williams, E. and Carmichael, C.: J. Nat'l. Med. Assoc. *42:* 32, 1950. 4. Goodman, L. and Gilman, A.: The Pharmacological Basis of Therapeutics, The Macmillan Co., 1941. 5. Katz, L. et al: Ann. Int. Med. *27:* 261, 1947. 6. Weiss, E. et al: Am. J. Psychiat. *107:* 264, 1950. 7. Alvarez, W.: Chicago Med. Soc. Bulletin, 581, 1950. 8. Rakoff, A.: A Course in Practical Therapeutics, Williams and Wilkins, 1948. 9. Karnosh, L. and Zucker, E.: A Handbook of Psychiatry, C. V. Mosby Co., 1945. 10. Harris, L.: Canad. M.A.J. *58:* 251, 1948.

Sandoz Pharmaceuticals

DIVISION OF SANDOZ CHEMICAL WORKS, INC.
68 CHARLTON STREET, NEW YORK 14, NEW YORK

Washingtonian Hospital
41-43 WALTHAM STREET, BOSTON, MASS.
Incorporated 1859

Conditioned Reflex, Antabuse, Adrenal Cortex, Psychotherapy, Semi-Hospitalization for Rehabilitation of Male Alcoholics

Treatment of Acute Intoxication and Alcoholic Psychoses Included

Outpatient Clinic and Social-Service Department for Male and Female Patients

JOSEPH THIMANN, M.D., *Medical Director*

Visiting Psychiatric and Neurologic Staff
Consultants in Medicine, Surgery and the Other Specialties
Telephone HA 6-1750

BAKER'S Combined Vitamins

EACH CAPSULE CONTAINS
5000 U.S.P. Units Vitamin A
1000 U.S.P. Units Vitamin D
5 mg. Thiamin Chloride (Vit. B_1)
5 mg. Riboflavin (Vit. B_2)
1 mg. Pyridoxine (Vit. B_6)
5 mg. Calcium Pantothenate
50 mg. Niacinamide
75 mg. Ascorbic Acid (Vit. C)
5 mg. d-alpha Tocopherol Acetates

$3.00 per Hundred

BAKER'S O. B. S. Vitamins

EACH CAPSULE CONTAINS
2000 U.S.P. Units Vitamin A
333 U.S.P. Units Vitamin D
2 mg. Thiamin Chloride (Vit. B_1)
2 mg. Riboflavin (Vit. B_2)
1 mg. Pyridoxine (Vit. B_6)
7 mg. Niacinamide
37.5 mg. Ascorbic Acid (Vit. C)
66.38 mg. Ferrous Sulfate, dried
725 mg. Dicalcium Phosphate

$3.00 per Hundred

RETAIL PRICE

Available to druggists through their wholesaler

Chester A. Baker Laboratories, Inc.
BOSTON, MASS.

BOSTON DIAGNOSTIC CLINIC
Affiliate of the Boston Evening Clinic

Ambulatory diagnostic service for people of moderate means

Instituted at the recommendation of the recent Greater Boston Community survey

HOURS: TUESDAY, THURSDAY AND SATURDAY MORNINGS BY APPOINTMENT ONLY

TUESDAY EVENING HOURS AVAILABLE

Patients accepted on reference of their own physicians, to whom completed reports are sent

COLLECTIONS

Fair Rates Prompt Reports
Good Public Relations

Write

CRANE DISCOUNT CORPORATION
HERALD TRIBUNE BUILDING
N. Y. 18, N. Y.
Established 1933

maintain edema-free state

Only one or two tablets daily—plus an occasional injection—are needed to maintain the cardiac patient at "dry weight" employing Tablets MERCUHYDRIN® with Ascorbic Acid. Some patients—freed of accumulated fluid with parenteral meralluride sodium—may be kept edema-free on tablets alone.

Tablets MERCUHYDRIN with Ascorbic Acid permit daily fluid control with a minimum of injections facilitating the frequent-dosage schedule of modern diuretic therapy.

ideal for ambulant patients and those who cannot be given frequent injections.

well tolerated when prescribed in the recommended dosage.

effective in producing mild, sustained diuretic action.

convenient—the oral is the safest and most convenient route.

Keep your cardiac patients edema-free with . . .

Tablets

MERCUHYDRIN®

WITH ASCORBIC ACID

dosage: One to two tablets daily—morning or evening—preferably after meals.

available: Bottles of 100. Each tablet contains meralluride 60 mg. and ascorbic acid 100 mg.

Lakeside Laboratories, INC., MILWAUKEE 1, WISCONSIN

A-Z RESEARCH LAB.
Established 1929—First in U. S. A.
Benjamin Parvey, M. D., *Director*
PREGNANCY TEST
Mice, Rabbits and Frogs
Reliable Results. Containers Furnished
636 Beacon Street, Boston 15, Mass.
Kenmore Square KEnmore 6-9600

GOOD OPENINGS for obstetrician, EENT specialist and surgeon, 20 miles north of Boston, in growing prosperous community. Specialist has large building to organize group clinic or share offices. Address A428, *New Eng. J. Med.* 8-eow-2t

WANTED—Resident for approved Department of Pathology. Immediate appointment or July 1. 300-bed general hospital in Brooklyn, New York. Address A429, *New Eng. J. Med.* 8-4t

FOR SALE—5-volume set of Blumer's *Therapeutics of Internal Disease* for $35 (list price, $75). Latest edition. Never used. Address A430, *New Eng. J. Med.* 8-1t

DOCTOR'S OFFICE, BEDROOM AND PRIVATE BATH in good residential neighborhood on main thoroughfare of prosperous, growing suburb of Boston. Large room, about 38' x 16', 6 big windows, garden and water view, oak floors, 2 fireplaces; well adapted for reception room and 1 or 2 inner offices. Also large, pleasant bedroom, furnished or not, large closet, fireplace and connecting bath. Ample heat, hot and cold water. Zoning regulations stipulate doctor *in residence.* Address A432, *New Eng. J. Med.* 8-1t

AVAILABLE IMMEDIATELY—Approved roentgenology residency. Very active department in 250-bed hospital. $100 a month plus maintenance. Apply to Dr. Charles Liebman, Roentgenologist, Newton-Wellesley Hospital, Newton Lower Falls, Mass. B362-8-3t

GRADUATE NURSE desires position in Boston physician's office. Call Edna Griffin, CI 7-9854, after 6 p.m. B363-8-3t

FOR RENT or FOR SALE in a few months—Combined home—office of general practitioner in southern New Hampshire town about 80 miles from Boston. Good house, 8 rooms, large yard, double garage. Office, 3 large rooms. Active practice for 20 years. Leaving to specialize. Address A424, *New Eng. J. Med.* 6-3t

LEARY LABORATORY
43 Bay State Road
Boston, Massachusetts
Timothy Leary, M.D., *Director*
Dependable and Rapid Laboratory Service. All Branches
Containers furnished
Tel. KE 6-2121

POSITION OF SUPERINTENDENT of Tewksbury (Mass.) State Hospital and Infirmary is vacant. Trustees seek physician or layman well trained in administration of large 2000-bed hospital. In application, state age, marital status, where trained in hospital administration. Starting salary, $10,270. Address replies to Robert L. DeNormandie, M.D., Lincoln, Mass. B360-6-4t

FOR RENT—Large, modern 4-room office, occupied past 42 years by physician, recently deceased. Excellent doctor's location, 50 miles from Boston. Harold J. Enright, 2 Summer Street, Fitchburg, Mass. B352-4-tf

MICROSCOPES
Bought, Sold and Repaired
BOSTON MEDICAL SUPPLY CO.
172 Harrison Ave., Boston
LI 2-8500

FOR SALE — Combination radiographic x-ray fluoroscope, shockproof, brand new, 20 ma, with timer. Priced reasonably for quick sale. Address A420, *New Eng. J. Med.* 5-4t-tf

EXCELLENT LOCATION for general practitioner or specialist in center of suburban Boston section. 3-room suite with equipment in large corner house. Busy doctor's office for many years. Will rent at once. Address A398, *New Eng. J. Med.* 1-tf

ELECTROENCEPHALOGRAPHIC LABORATORY, INC.
270 Commonwealth Ave., Boston KE 6-8100
Electroencephalograms
Electromyograms

CAMP DOCTOR WANTED. New Hampshire boys' camp. 8-week season, starting June 30. Will consider split-season applicants. Employment possible for wife as nurse or counselor. Address A409, *New Eng. J. Med.* 4-oam-2t

Pregnancy Test Specialists
The Charles River Breeding Labs., Inc.
Henry L. Foster D.V.M., Director
● *Results in 6 hours*
● *3 animals per test*
● *Containers furnished*
● *99% accuracy*
$4.00 per test
77 Leverett St., Boston 14, Mass.
LA 3-1398

WANTED AT ONCE—Associate or locum tenens for general practitioner (medicine, surgery and obstetrics). Very lucrative practice in stable industrial community of 20,000. 5-room suite with laboratory and emergency x-ray facilities. Services of 40-bed modern hospital available. Graduate of Class A school only. Address all communications to A407, *New Eng. J. Med.* 4-5t

Memorial Center for Cancer and Allied Diseases offers 1-year APPROVED FELLOWSHIP IN ANESTHESIOLOGY to graduates of approved medical schools. Applicants must have 1-year approved internship and 1-year approved training in anesthesiology. Openings available April 1, 1951, and July 1, 1951. For information refer to Dr. Olga Schweizer, 444 East 68th Street, New York City 21. B321-20-tf

UNITED LIMB & BRACE CO., Inc., manufacturers of artificial limbs. 61 Hanover Street, Boston. CA 7-2183. B517-6-tf

BIND your *New England Journal of Medicine.* Make it a permanent part of your library—for easy reference and lasting wear. In full black library buckram, only $3.00 per volume, plus shipping charges. All other journals and periodicals bound also. Inquiries invited. Norden Bindery, 2100 West Grand Avenue, Chicago 12, Ill. B300-14-tf

144 COMMONWEALTH AVENUE, at Dartmouth Street — 3-room professional suites on first and second floors. Moderate rental. B345-2-tf

BAY STATE ROAD OFFICE to share —2 rooms and reception room. Free 5 afternoons. Address A374, *New Eng. J. Med.* 21-tf

COLONIC IRRIGATIONS, massage, diathermy. Beatrice M. Woods, 511 Beacon Street, Boston. CO 6-8722. B80-16-tf

Why physicians specify ILETIN (INSULIN, LILLY) PREPARATIONS

Several reasons, we believe, prompt doctors to name Iletin (Insulin, Lilly) preparations when prescribing for their diabetic patients. One reason probably is based on recognition—the desire to support the laboratory which first made Insulin commercially available in the United States. Another is a form of encouragement—to further the developments in diabetic control to which Lilly devotes so much attention. Still another, and perhaps the best reason of all, is confidence—in the integrity of the manufacturer and in the reliability of the Lilly trade-mark.

ILETIN (INSULIN, LILLY) PREPARATIONS

Detailed information and literature on Iletin (Insulin, Lilly) preparations are personally supplied by your Lilly medical service representative or may be obtained by writing to Eli Lilly and Company, Indianapolis 6, Indiana, U.S.A.

Lilly

SINCE 1876

LILLY SINCE 1876

The birth of a trade-mark

When Colonel Eli Lilly opened his pharmaceutical laboratory in 1876, he gave his personal assurance that Lilly products would be found trustworthy. As a sign of his sincerity, he placed his own signature on every package. This enterprise progressed, partly because it had been planted in a healthy economic soil, partly because of honest hard work, but mostly because it kept faith with the promise of reliability. To this day, the signature on every Lilly container continues to be more than an ordinary trade-mark. It is an endorsement of the product, a guarantee of reliability.

Lilly

ELI LILLY AND COMPANY · INDIANAPOLIS 6, INDIANA, U.S.A.

The New England
Journal of Medicine

Copyright, 1951, by the Massachusetts Medical Society

Volume 244 FEBRUARY 22, 1951 Number 8

BILATERAL THYROTOMY FOR CARCINOMA OF THE LARYNX*

JOSEPH I. KEMLER, M.D.†

BALTIMORE, MARYLAND

THYROTOMY for carcinoma of the larynx has been practiced since 1870 with varied success. The results were very discouraging at first, as, for instance, in Billroth's Clinic, where eight cases were operated on between 1870 and 1884, and only one patient survived less than three years without recurrence of the condition. Paul Bruns recorded nineteen cases in the same period, with only two survivals of one year. From these statistics it was then concluded by such men as Morrell Mackenzie, Butlin, Semon and Moure that thyrotomy is an undesirable operation, and should not be attempted in cases of cancer of the larynx. However, these same men, and others such as Chiari, Koschier, Schmigelow, Delavan and Chevalier Jackson, have developed this operation, splitting the larynx for the excision of cancer, to a successful issue in favorable cases.

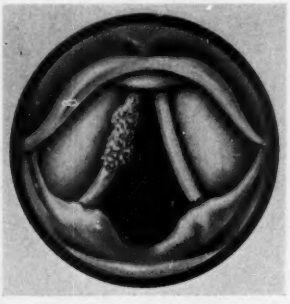


FIGURE 1. *Carcinoma of the Larynx Limited to Anterior Two Thirds of Right Mobile Cord.*

The indications for this operation are now quite well established: namely, a carcinoma situated in the anterior two thirds of the larynx, limited to one cord and without its fixation (Fig. 1 and 2). St. Clair Thomson[1] states: "Good results are even obtainable if the disease has spread across the anterior commissure, so that all of one cord and a portion of the other have to be excised." Many laryngologists are in accord with him, and Chevalier Jackson[2] has developed a special technic, called the anterior commissure operation, for such cases. Davis, Colledge, and Lederman[3] claim that a slight extension upwards into the ventricular bands or into the ventricles does not make it unsuitable for successful excision. However, laryngofissure surgery has some undesirable aspects, from which recurrences may result.

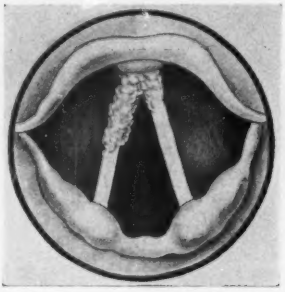


FIGURE 2. *Carcinoma of Anterior Half of Left Vocal Cord; Beginning Invasion of Anterior Commissure.*

Carcinoma of the larynx is mostly found in the anterior part, and according to Broyles[4] in 95 per cent of cases is of the squamous type. It destroys by direct extension, rather than by metastasis. Although the cartilages are highly resistant to the invasion of the carcinoma, there are two weak spots through which the new growth may spread, either by direct extension or through migrating cells[5] from the

*Read at the meeting of the New England Otolaryngological Society, Boston, Massachusetts, June 14, 1950.

†Instructor in ophthalmology, University of Maryland School of Medicine; member, surgical staffs, Baltimore Eye, Ear, and Throat Hospital and Mt. Pleasant Sanatorium; consultant in otolaryngology, Sinai Hospital, Baltimore, Maryland.

nearby growth. Broyles says:

> A subglottic growth may penetrate the cricothyroid membrane. Another weakness is to be found in the posterior wall of the crista of the thyroid cartilage where the anterior commissure tendon is inserted.
>
> This tendon is a band of fibrous tissue containing lymphatics and blood vessels. . . .The attachment of the tendon extends from the upper portion of the thyroid cartilage caudalward for approximately 10 mm. . . . Also of interest is the mass of elastic tissue just posterior to the division of the tendon and located in the anterior tip of both vocal cords.

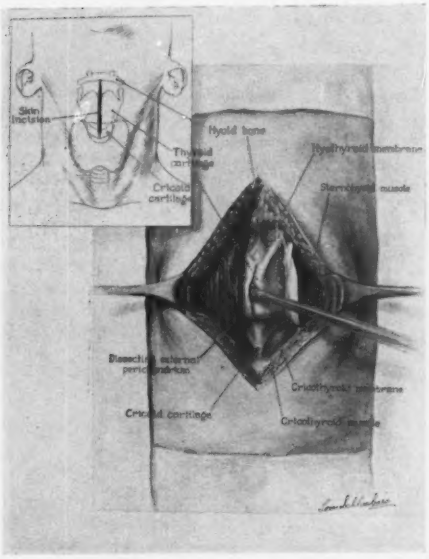


FIGURE 3.

Broyles[6] concludes another article by saying:

> On the basis of this anatomical study it would appear that in the laryngofissure operation it is always desirable to remove, along with the diseased vocal cord, the anterior ridge or crista of the cartilage and the anterior portion of the healthy cord.

I believe that the other weak point — the cricothyroid membrane — should also be removed. The classic laryngofissure simple or anterior commissure operation cuts the cartilage in the midline, where cancer cells may be present. It is difficult to separate the inner perichondrium, with tumor tissue possibly present in the anterior commissure, from the cartilage without tearing. More posteriorly, the inner perichondrium is easily separated. To take advantage of this factor, and to eliminate the danger of carcinomatous spread through the anterior commissure, I devised the bilateral thyrotomy for carcinoma of the larynx. By this operation, the anterior commissure with the cartilage attached, part of the uninvolved cord, the whole involved cord and arytenoid cartilage if necessary and the cricothyroid membrane are removed in one mass.

The technic of this operation may be summarized as follows:

The patient's pharynx and larynx are anesthetized by the indirect method with a 2 per cent solution of Pontocain or a 10 per cent solution of cocaine with a spray and laryngeal syringe. He is then prepared and put in position as for a thyroid operation, with the head slightly extended. A 1 per cent solution of novocain (a few drops of epinephrine, 5 to the ounce, may be added if he has no hypertension) is injected in the midline where the incision will be made. General anesthesia with Pentothal Sodium has also been used successfully.

FIGURE 4.

A midline incision is made from the hyoid bone to just below the cricoid cartilage. This incision is carried down to the thyroid cartilage without dissection of the flaps. The external perichondrium is incised in the midline and dissected on each side of the thyroid cartilage for 1 cm. The whole cartilage is then incised vertically on each side at this distance from the midline, leaving the crista with 1 cm. of cartilage on each side exposed or denuded of perichondrium. These vertical incisions

are made only superficially with a semisharp knife, and may extend to but not through the inner perichondrium. They are made only to designate the extent of cartilage to be removed. The inner perichondrium of the lower border of the thyroid cartilage is dissected away from the cartilage under the incision, and with any sphenoid punch or a small Kerrison mastoid rongeur a vertical trough is punched out at the line of incision of the cartilage. Care should be taken not to injure the inner perichondrium (Fig. 3–5). Both sides are treated in the same manner.

The next step is mass separation. The inner perichondrium on the involved side is next separated from the rest of the ala of the thyroid cartilage throughout its entire extent. On the uninvolved side to the opposite. With a blunt-ended, straight scalpel, such as one uses in rhinoplasty, the incision is continued up on the uninvolved or less severely involved side through the freed inner perichondrium, up to the top of the thyroid cartilage, then across the thyroid notch to the opposite side. The crista, with the 1 cm. of cartilage on each side, the inner perichondrium attached, is folded over, like an open door, and the interior of the larynx exposed.

FIGURE 5.

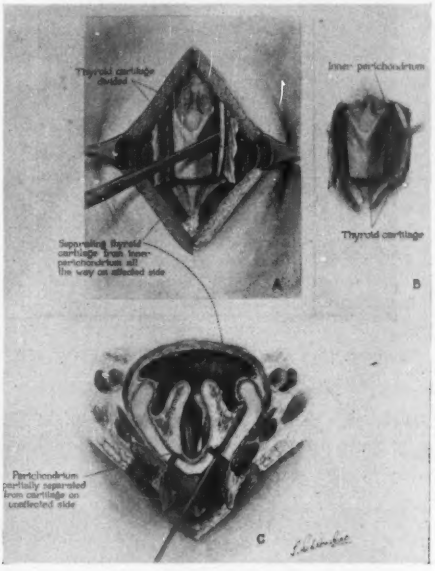


FIGURE 6.

or less involved side, the separation of the inner perichondrium may be carried on beyond the incision of the cartilage, or not at all, according to the location of the tumor (Fig. 6).

Mass extirpation follows this. The cricothyroid membrane is penetrated with a hypodermic needle, and a few drops of a 2 per cent solution of Pontocain are instilled into the larynx. This prevents the patient from coughing when the larynx is opened. With the aid of suction, a horizontal incision is then made into the membrane along the upper edge of the cricoid cartilage, from the more severely involved

A sponge with a string attached is placed in the pharynx to prevent saliva from entering the wound. Then, with straight and curved scissors, the entire mass, previously freed and now held in position by the upper rim of the thyroid cartilage on the involved side and posteriorly by the arytenoid cartilage, is cut out. This mass consists of the cartilaginous crista with the anterior commissure, ventricular band, true cord and tumor, with or without the arytenoid cartilage, and the cricothyroid membrane. The larynx remains wide open, so that bleeding points can be seen and controlled easily, either by pressure or by coagulation (Fig. 7–10).

When the wound is dry, it is closed by suturing the outer perichondrium and the muscles with catgut (Fig. 11), and the skin sutured over that. No tracheotomy tube is used, and none is inserted after

the operation, unless bleeding cannot be stopped without packing. In the operations in which I have followed this technic, the bleeding was slight and easily controlled. The neck is dressed as usual, and the patient is put to bed in a semi-recumbent position, which makes cough and expectoration much easier. No opiates are given before, during or after the operation.

Penicillin, started just before the operation, is continued for four days in ordinary doses. No feeding tube is used at this stage, and nothing is given by mouth for twenty-four hours after operation. Meanwhile, the patient is nourished with a solution of glucose, given parenterally. Strict silence is maintained by the patient for the next two weeks. On the second day after the operation, he is allowed to try to swallow sterile isotonic saline solution,

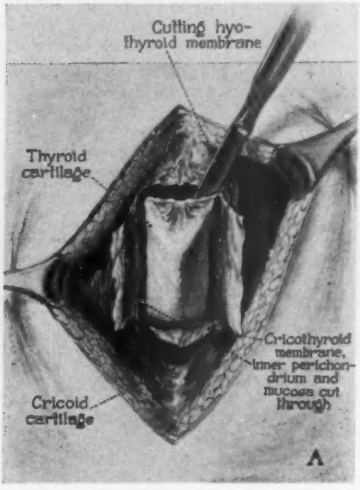


FIGURE 7.

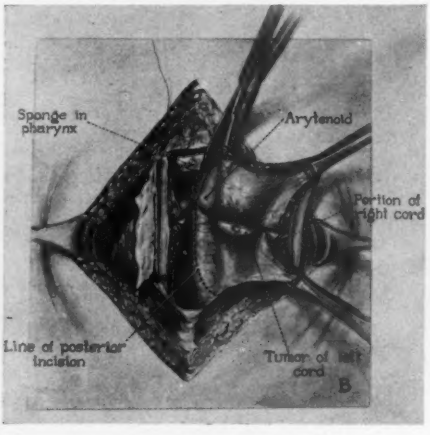


FIGURE 8.

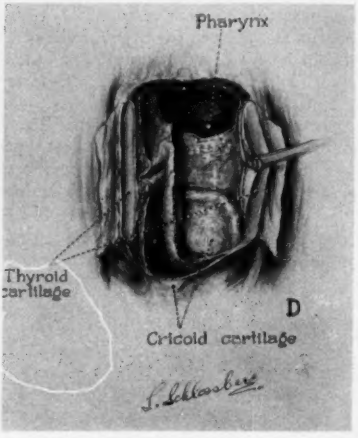


FIGURE 9.

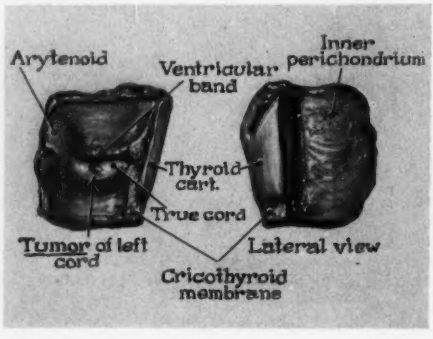


FIGURE 10.

and if he swallows without regurgitation he is given sterile liquids to drink for the next twenty-four hours. After the second postoperative day, if swallowing is effective, the patient is given a full liquid diet for the following two days. Then, if there is no pain upon swallowing, a liberal diet is given. The patient is not restricted to bed but is allowed to move around, even during the first few days, and is discharged from the hospital in about ten days' time. After this his wound is periodically checked for granulations and infection.

There were no granulations in the cases operated on in our clinics. However, if granulations should appear, they may be removed with cold forceps and their bases cauterized electrically, as after any laryngofissure operation. This prevents the recurrence of granulations. Granulations should be examined microscopically for malignancy. As a rule the patient regains a useful voice in about three weeks, and the larynx is thoroughly healed in about six weeks. He should then be periodically examined during the next five years or more.

I cannot recommend operating on women with this procedure. The anteroposterior diameter

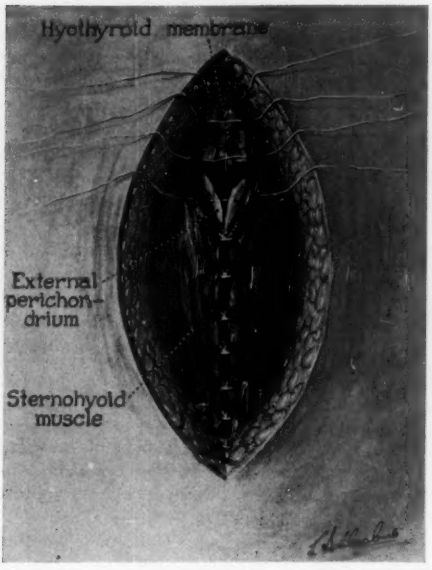


FIGURE 11.

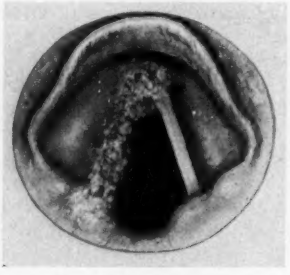


FIGURE 12. *Extensive Carcinoma of the Larynx.*

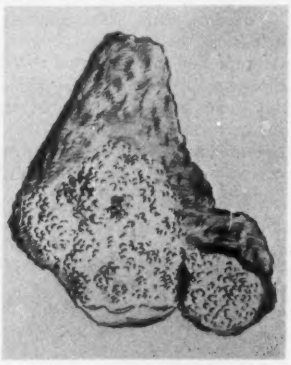


FIGURE 13.

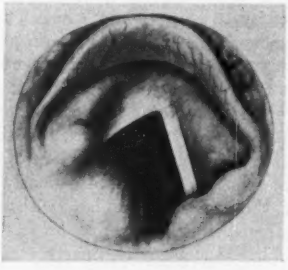


FIGURE 14.

of their larynx is rather short, and the breathing space may not be adequate after the anterior commissure is taken out. One of my women patients required a permanent tracheotomy after the cicatricial contraction appeared, and I have learned from colleagues of other instances of difficulty in women after the use of this procedure.

Fifteen men were operated on by me and my associates in the first two years, with uniformly good results. One patient had a slight complication: a tracheotomy tube had to be inserted two days after the operation because of edema. This subsided very quickly, and he was extubated three days later; he had no further trouble.

I have operated with this technic on much more extensive carcinomas of the larynx, using it by

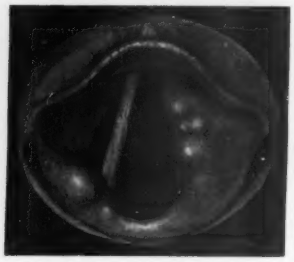


FIGURE 15.

choice in most cases. One patient was operated on of necessity, as he would not consent to have his larynx removed. Although his cancer was extensive, as illustrated in Fig. 12, the involved cord was somewhat motile, and since he refused a laryngectomy I operated according to the technic described here on May 15, 1947. I removed half the less involved cord, the anterior commissure with cartilage, the whole of the more seriously involved cord, and the arytenoid cartilage with much surrounding tissue, to the midline of the posterior commissure (Fig. 13). He was then given 4000 r of x-ray therapy over a period of a month, receiving 200 r daily except Saturdays and Sundays, on the right and left sides alternately. This course of x-ray therapy is also given routinely in cases of more extensive carcinoma after the operation. Figure 14 is a drawing of the larynx of the last case, made three years after completion of treatment. This can be favorably compared with Figure 15, a drawing of a larynx made three years after operation in a case of less extensive carcinoma. In this case the arytenoid cartilage was not removed, and x-ray therapy was not given. Recovery of the voice was similar in both cases.

COMMENT

Bilateral thyrotomy can be used not only on tumors requiring laryngofissure, but also in more advanced cases of carcinoma of the larynx, provided that the tumor can still be removed with an ample margin of normal tissue. By this operation, one can remove the soft tissues of the larynx with the arytenoid cartilage on one side plus the anterior commissure with its cartilage, and half of the other side, all in one mass. The defect is filled in by newly formed healthy tissues, which compensate for the loss of the whole cord; it is bridged by a band of scar tissue to the remaining opposite cord (Fig. 14 and 15). There is ample room for breathing, and the phonation is as good as it is after any laryngofissure operation. All the patients so operated on are still under observation, and we hope to record five-year cures.

The advantages of this operation are:

Short incision, without dissection of the flaps, and without interference with the thyroid gland.

Ease of cutting the cartilages without injuring the inner perichondrium.

Ease of dissection of the inner perichondrium without danger of cutting the tumor or cutting too close to it.

Removal of the crista, with the anterior commissure, with the cord or cords.

Minimum manipulation after opening of the larynx.

No need of a tracheotomy tube.

Good exposure with least retraction of cartilages.

More thorough extirpation of the tumor with a good deal of surrounding tissue en masse without mutilation.

Easy control of bleeding.

Rapid healing, with little or no reaction.

Small risk of stenosis, as the cartilages have a tendency to spread apart rather than to collapse.

Effectiveness of this method in all cases of carcinoma of the larynx in men suitable for laryngofissural or anterior commissural operations.

SUMMARY

A new conservative operation for cancer of the larynx, bilateral thyrotomy, has been described. This operation is recommended for any cancer of the larynx requiring laryngofissure. In many cases this procedure may take the place of laryngectomy. The larynx is widely opened, and the tumor is entirely visible and may be completely removed

with ample margin of normal tissue. The anterior commissure, with the overlying cartilage and the cricothyroid membrane (the two areas through which the new growth may spread), are always removed.

I am indebted to Dr. David Davis of Washington, D. C., for the inspiration and aid he has given me in developing this procedure.

1908 Eutaw Place

References

1. Thomson, S. C. *Diseases of the Nose and Throat.* 791 pp. New York: D. Appleton & Co., 1911. P. 492.
2. Jackson, C., and Jackson, C. L. *Diseases of the Nose, Throat and Ear.* 844 pp. Philadelphia: W. B. Saunders Co., 1945. P. 569.
3. Davis, E. D. D., Colledge, L., and Lederman, M. Discussion on treatment of carcinoma of larynx. *Proc. Roy. Soc. Med.* **38**:353-362, 1945.
4. Broyles, E. N. Anterior commissure tendon. *Ann. Otol., Rhin. & Laryng.* **52**:342-345, 1943.
5. Broyles, E. N. New operative procedure for laryngofissure. *South. M. J.* **42**:825-839, 1949.
6. Broyles, F. N. Anterior commissure tendon of larynx: its significance in laryngofissure operation. *Bull. Johns Hopkins Hosp.* **70**:90, 1942.

CARDIOVASCULAR MANIFESTATIONS IN ACUTE POLIOMYELITIS*

Louis Weinstein, M.D.,† and Alexis Shelokov, M.D.‡

BOSTON

CARDIOVASCULAR disturbances in poliomyelitis were first described in 1910 by Robertson and Chesley,[1] who commented on the presence of interstitial edema and swelling of the fibers in the myocardium of patients dying of the infection. The earliest clinical report of heart involvement was published in 1912 by Hertz, Johnson and Depree[2]; they observed a patient who recovered from an attack of infantile paralysis in which myocarditis was present. Although the presence of cyanosis, rapid pulse, and cardiac arrhythmias in severe cases had been noted in passing by many students of this disease, it remained for Saphir and Wile[3] in 1942 first to emphasize myocarditis as a common feature of acute poliomyelitis.

Saphir and Wile in this study found myocarditis in 6 of 7 patients who died of poliomyelitis. The anatomic changes consisted mainly of infiltration of the cardiac muscle by lymphocytes, or by mononuclear or adventitial cells; in only two cases were polymorphonuclear leukocytes present in appreciable number. Clinical findings suggesting myocarditis during life were sudden progression in the disease, cyanosis, tachycardia, bradycardia or irregularities of rhythm. No relation between the severity and duration of the infection and the development of myocardial involvement was apparent. Seventeen additional cases, 10 of which had shown myocardial reactions according to his criteria, were described by Saphir in 1948.[4] Nine fatal cases of the bulbospinal form of infantile paralysis were reported by Peale and Lucchesi[5]; all had vascular, perivascular and interstitial infiltration of cells in the myocardium. Dublin and Larson[6] noted myocarditis in 2, and hemorrhagic pulmonary edema in 3, of 12 cases of poliomyelitis studied at autopsy. An anatomic study of 92 patients dying of this disease made by Dolgopol and Cragan[7] revealed inflammatory reactions in the hearts of 17.4 per cent. The lesions were located primarily in the posterior wall of the left ventricle and in the posterior papillary muscles, and consisted of increase in the number of nuclei, thinning and cloudiness of muscle, collections of cells, predominantly mononuclear, between intact muscle fibers and interstitial perivascular infiltration with monocytes or polymorphonuclear leukocytes. Pathological examination of 35 cases by Ludden and Edwards[8] disclosed verrucous mitral endocarditis involving an otherwise normal heart in one, endarteritis of a patent ductus arteriosus in another and rupture of the right atrium in a third. Histologic changes were present in 40 per cent, and varied from minimal alteration of myocardial fibers and perivascular collections of large mononuclear cells to focal coagulation necrosis of muscle with polymorphonuclear leukocytic infiltration. Verrucous endocarditis has also been observed by Luhan.[9] Clawson[10] demonstrated findings consistent with myocarditis in 12 of 53 patients who succumbed to poliomyelitis. Other descriptions of the pathologic changes in the heart in infantile paralysis are those of Abramson,[11] Cowie, Parsons and Lowenberg,[12] Larson[13] and Spain, Bradeos and Parsonnet.[14]

In the first reported study of electrocardiographic changes in poliomyelitis, Battro, Cibils and Medez[15] found evidence of transient myocarditis in 4 of 20 cases in the acute stage of the infection; cardiac involvement was absent in the chronic phase. In 456 patients with infantile paralysis, excluding those with known cardiac disorders, Gefter and his co-workers[16] noted murmurs in 7.5 per cent and arrythmias of various types in 2 per cent; 2 patients had cardiomegaly, and 3 were cyanotic. Abnormal electrocardiographic records — high, peaked P waves, prolongation of the PR interval, slurring of the QRS complex, significant depression of the RST segments, arrythmias, and T-wave alterations in one or more leads — were demonstrated in 14.2 per cent. The frequency and intensity of the changes

*From the Haynes Memorial and Evans Memorial, Massachusetts Memorial Hospitals, and the Department of Medicine, Boston University School of Medicine.

†Associate professor of medicine, Boston University School of Medicine; lecturer on infectious diseases, Harvard Medical School; chief, Infectious Disease Service, Haynes Memorial, Massachusetts Memorial Hospitals.

‡Assistant in medicine, Boston University School of Medicine; assistant in infectious diseases, Harvard Medical School; resident, Haynes Memorial, Massachusetts Memorial Hospitals.

appeared to be related to duration of fever and severity of involvement of the nervous system, but not to age. Autopsy in 6 cases revealed pulmonary edema in 4 and dilatation of the right ventricle in 2; histologic study disclosed congestion, interstitial edema, and perivascular and interstitial cellular infiltration of the myocardium. Boucek, Bailey, Burchell and Edwards[17] described an instance of fatal bulbospinal disease with hypertension, elevation of the ST segment and diphasic T waves in Lead 1 of the electrocardiogram. Edema and neutrophilic infiltration of the heart muscle were present. The most recent electrocardiographic observations in poliomyelitis are those of Bradford and Anderson,[18] who found abnormalities in 12 per cent of 155 cases. Right ventricular strain, slight AV conduction defects and significant T-wave alterations in the limb or chest leads or both were observed. In 3 of the patients who died, there was lymphocytic and less marked monocytic infiltration of the myocardium.

TABLE 1. *Electrocardiographic Changes in Poliomyelitis, 1947 and 1949.*

TYPE OF ABNORMALITY	NUMBER OF PATIENTS UNDER 16 YEARS	NUMBER OF PATIENTS OVER 16 YEARS
P-wave depression or notching	2	0
Increased PR interval	4	0
Increased QT interval	2	0
Q_1T_1 pattern	1	0
Q_3T_3 pattern	1	0
Widened QRS complex	0	1
ST depression	2	3
Significant T-wave inversion	6	6

Although observations of blood-pressure levels in poliomyelitis have been common, most papers describing this disease make few or no remarks concerning the presence of hypertension. One of the best studies on this subject is that of Grulee and Panos.[19] These investigators noted diastolic hypertension in 72.9 per cent of patients with bulbar poliomyelitis. Elevated blood pressure was found in only 7 per cent of the spinal forms and 12 per cent of the nonparalytic forms of the disease. The development of hypertension when respiratory-center involvement and hypoxia were present has been commented on by the Minnesota Poliomyelitis Research Commission.[20]

Grulee and Panos had the following to say regarding the role of suboxygenation:

> It has been suggested that hypoxia, in the absence of visible cyanosis, may result in compensatory elevation of blood pressure. However, the persistence of hypertension in several instances for several days after continuous administration of oxygen by mask, intratracheally, or by oxygen tent, suggests that damage to the cardiovascular centers was the causative factor.

Platou[21] considered marked fluctuation or definite elevation in blood pressure to be one of the most valuable signs in predicting the onset of bulbar involvement.

The purpose of the present investigation was to determine the incidence and character of cardiovascular disturbances in a large group of patients with various forms of poliomyelitis. In the summer of 1949, an opportunity to observe 428 cases of this disease presented itself. Since 50 per cent of the patients were adults, it was possible to compare the relative frequency of disturbances in the heart and blood vessels of persons of all age groups. Four points were stressed: electrocardiographic abnormalities, blood-pressure levels, the incidence and importance of pulmonary edema, and pathologic and anatomic alterations in the heart. In all instances an effort was made to relate these findings to age.

RESULTS

Electrocardiographic abnormalities. In 1947, 57 consecutive cases of poliomyelitis were studied by means of serial electrocardiographic tracings, a total of 298 records being made, or an average of 5.6 per patient. Fourteen patients or 25 per cent had abnormalities demonstrable by electrocardiogram. There was little difference in the incidence of abnormal records in the various age groups. The findings included high-peaked, notched T waves, increase in PR and QT intervals, a Q_3T_3 pattern, T-wave inversions in leads other than 3, and depression of the ST segment; no P-wave changes or lengthened PR or QT intervals were observed in those over 16 years of age.

In 1949, 428 patients were studied, but, because of the pressure of so great a number of admissions to the hospital in a short period of time, routine electrocardiograms were not made. However, electrocardiograms were taken in 28 patients, serially in 11. Eleven cases showed abnormalities of the same type as those observed in 1947. The most striking finding was a Q_1T_1 pattern in a young woman who had acute myocarditis at autopsy. In every case, the normal electrocardiographic patterns reappeared as the patients recovered from the acute phase of poliomyelitis.

Hypertension. Seven per cent of the patients had prolonged elevation of blood pressure during the course of their illness; 22 (73.2 per cent of those with hypertension) were over 16 years of age; 5 had spinal, 16 bulbospinal and 1 pure bulbar poliomyelitis. In those under 16, there were 2 cases of spinal, 5 of bulbospinal and 1 of bulboencephalitic disease. The degree of hypertension was graded according

to the following standards: *mild*, consisting of elevation of the systolic level by 20 to 40 mm. of mercury; *moderate*, consisting of a rise of 40 to 50 mm. and *severe*, with a systolic blood pressure more than 50 mm. higher than the normal for the patient's age. There was usually a commensurate increase in the diastolic pressure. The data relative to the degree of hypertension and associated clinical phenomena are presented in Table 1. In view of the equal number of cases in the groups of patients under and over 16 years of age, it is striking that hypertension was more common in the older patients; this is probably related to the greater severity of the infection in them. Outstanding, too, was the almost constant association of cyanosis with an elevated blood pressure, and the relief of the hypertension when respiration was made more efficient by mechanical means and the administration of oxygen, or both. These observations suggest that the cause of hypertension in most cases of poliomyelitis is suboxygenation, and that correction of this defect usually results in restoration of a normotensive level. While all students of this infection have observed instances in which the blood pressure has been elevated for a period of time longer than could be accounted for by hypoxia alone or, for that matter, has remained high in the late convalescent phase—such cases are distinctly uncommon. The mechanism for the production of persistent hypertension, not influenced by the state of oxygenation, is probably quite different from the one responsible for short-lived episodes.

Table 2. *Clinical Findings in Patients with Hypertension in Poliomyelitis.*

Degree of Hypertension	No. of Patients in Group	Cyanosis	Irregular Respiration	Suction Used	Postural Drainage	Improved* on O_2 Alone	Improved* on Respirator Alone	Improved* on O_2 with Respirator	Improved* on O_2 with Electrophrenic Respirator
Under 16 yr.									
Mild	3	1	1	1	1	1	—	—	—
Moderate	3	3	2	3	3	3	—	—	—
Severe	2	2	2	1	1	1	—	1	1
Over 16 yr.									
Mild	4	3	2	3	3	3†	2†	2†	—
Moderate	4	3	3	3	3	3†	1†	2†	—
Severe	14	14	13	12	10	14	13†	13†	5†

*Reduction in blood-pressure level as well as clinical improvement soon after initiation of the procedure.
†Used only in this number of patients.

Pulmonary edema. Four of 16 fatal cases (25 per cent) in this group were found to have severe pulmonary edema at the time of autopsy. All had involvement of the ninth and tenth cranial nerves; 3 had paralysis of the spinal type also. Only 1 required artificial respiration, but 3 needed postural drainage and suction in order to facilitate respiratory exchange. Hypertension developed in the 2 adults, but was relieved by oxygen administration; shock was present shortly before death in 3 cases.

In 2 of the patients who died with acute pulmonary edema, the intravenous administration of fluid may have hastened the outcome. One 16-year-old boy, who had only very mild bulbar poliomyelitis when admitted to the hospital, was given an intravenous infusion of 5 per cent glucose in saline solution because of moderate dehydration, and died suddenly after receiving 800 cc. over a period of one and a half hours. Another, 8 years old, developed progressively increasing dyspnea, tachypnea, orthopnea, tachycardia, disorientation, cyanosis, convulsions and coma, and died within a few minutes of the intravenous administration of only 50 cc. of the solution. The other 2 patients had received fluids intravenously and subcutaneously for several days before death, and at no time had shown any clinical findings suggesting the presence of pulmonary edema. Pathological examination, in addition to disclosing pulmonary edema, revealed the following:

In Case 1, aged 8, there were intense infiltration of polymorphonuclear cells, edema and slight degeneration of muscle fibers.

In Case 2, aged 16, there was mild interstitial edema of the myocardium.

Case 3, aged 24, showed focal and diffuse myocarditis with focal degeneration of cardiac muscle and polymorphonuclear exudate.

Case 4, aged 24, showed bilateral pleural effusion and verrucous vegetations, nonrheumatic in character, superimposed on minute ulcerations on the mitral valve. There were no bacteria in these lesions. The myocardium was infiltrated with mononuclear cells.

Pathological and anatomic findings. The hearts of 16 patients were examined at autopsy; 12 revealed slight to moderate interstitial edema, hydropic degeneration, and a small increase in the number of interstitial lymphocytes, mast cells and plasma cells. Right-sided dilatation was common. In one case there were, in addition, focal myocardial hemorrhages associated with fibrinoid degenera-

tion of the blood vessels; another showed focal edema of the mitral valve, with minute nodules on the surface of the leaflets and a third disclosed hemorrhage into the mitral valve. In one case there was acute pericarditis with a sterile, creamy effusion that contained neutrophils and fibrin and extended into the superficial layers of the myocardium. Nonbacterial pneumonitis of unknown etiology was present in this case. The findings in those who died with pulmonary edema have been described above.

Study of the hearts of 32 patients who succumbed to poliomyelitis prior to 1949 revealed slight to moderate edema and a small increase in interstitial cells in all.* Only one specimen disclosed the muscle degeneration and neutrophilic infiltration characteristic of acute myocarditis.

Discussion

Electrocardiographic changes appear to be quite common in patients with poliomyelitis, ranging in incidence from 12 to 25 per cent in various recorded series. A wide variety of findings varying from minor T-wave changes to patterns suggestive of myocardial infarction have been observed. Although it is difficult to draw any conclusions concerning the relation of age to abnormalities in the electrocardiogram, there seems to be little doubt that the severity of the nervous-system infection is a determining factor. The significance of changes in the electrocardiographic pattern of the heart with respect to subsequent alteration in cardiac function in surviving patients cannot be evaluated at the moment. A long-term follow-up study of a group of cases of this type might be of great value.

Hypertension presents an important problem in poliomyelitis. In our group of patients it was most common in the severely ill, but it may occur even with mild attacks. The data presented in this paper suggest that elevation of the blood pressure is in most cases related to hypoxia, and that return to the normotensive state can be produced by establishing a clear airway, overcoming respiratory failure by various mechanical means or administering oxygen.

Age appears to be an important factor in the development of myocarditis. Thus, in our patients and in those of Ludden and Edwards the older ones were more prone to develop this cardiac complication, and it was more severe than when it occurred in young people. When the cases in the series of Ludden and Edwards are divided into groups on the basis of age, it is clearly shown that of the fatal cases 27 per cent of those less than 16 years old and 55 per cent of those over this age had involvement of the myocardium. The relation of poliomyelitis to the type of mild myocarditis characterized by slight edema of cardiac muscle and round-cell infiltration that has been described in many patients is open to some question, since the same findings may be present in other diseases; it is possible that these changes may be produced merely by hypoxia that may be present for some time before death. On the other hand, the presence of neutrophils, destruction of muscle and ulceration of valves indicate serious involvement of the heart, which is probably a direct effect of poliomyelitis.

Pulmonary edema is a constant, serious menace in poliomyelitis, particularly in the bulbar, bulbospinal and bulboencephalitic forms. Two possibilities suggest themselves as being responsible for this complication: a nervous mechanism and cardiac failure. Since all the cases that we observed with edema of the lungs had the bulbar type of infection, a central origin seems more likely, although disease of the myocardium may have been a contributing factor in some. The occurrence of pulmonary edema in bulbar poliomyelitis raises some very important questions concerning treatment. Since many patients with this type of infantile paralysis are unable to swallow, parenteral hydration is often necessary. Our experience with two children who died shortly after the intravenous administration of small amounts of fluid suggests that water and electrolyte balance should be accomplished by means of the subcutaneous route when necessary, that great caution should be exercised against giving too large quantities of fluid and that intravenous hydration should probably be avoided. In view of the swelling of the spinal cord that is so prominent a feature of poliomyelitis, the danger of cerebral edema (particularly in young children with infections of the nervous system) and the menace of pulmonary edema, it is probably safest to limit the fluid intake temporarily to a level somewhat below the actual requirement.

The studies reported here, and others that have appeared in the literature, support the growing concept of poliomyelitis as a diffuse disease, rather than one limited to the anterior horn cells of the spinal cord. There is ample evidence to indicate that various portions of the brain, the sympathetic ganglions and the posterior columns of the spinal cord may be involved. That damage may be produced in structures outside the nervous system is strongly suggested by the finding of severe myocarditis. Although nervous control of the cardiac muscle may be affected by this infection, it is difficult to explain the marked anatomic changes on this basis alone; a more likely mechanism is invasion of the myocardium by the virus. The investigations described here are not intended to furnish final information on cardiovascular involvement in poliomyelitis; rather, they are indicative of the need for more intensive study of this important problem.

*Examinations were made by Dr. Russell H. Pope, Department of Pathology, Massachusetts Memorial Hospitals.

Conclusions

Abnormalities of the electrocardiogram occur frequently in the acute phase of poliomyelitis. Their appearance is associated with the severity of the infection, and not with the age of the patients.

Hypertension is relatively common in acute poliomyelitis. Its development in most cases is probably related to hypoxia; return to the normotensive state can be produced by maintaining adequate ventilation.

Acute pulmonary edema is common in fatal cases of the bulbar forms of poliomyelitis. Careful management of fluid intake in patients with bulbar disease is necessary; intravenous hydration is probably best avoided.

Myocarditis occurs in poliomyelitis. The mild form is probably hypoxic in origin, whereas the severe form may be due to invasion of the heart by the virus.

Sterile verrucous endocarditis may occur in poliomyelitis.

The problem of the cardiovascular disturbances in poliomyelitis needs further study. Of particular interest is the eventual fate of patients with cardiac abnormalities who survive an attack of this disease.

Since this paper was submitted for publication, another interesting report on electrocardiographic changes in poliomyelitis has appeared in the literature. Joos and Yu (Joos, H. A., and Yu, P. N. G. Electrocardiographic observations in poliomyelitis. *Am. J. Dis. Child.* **80**:22-23, 1950) studied the electrocardiograms of 23 patients. The QT interval was prolonged in 5 and equivocal in 3 cases. Although the authors noted other electrocardiographic abnormalities, only the QT alteration was regarded as of diagnostic significance.

References

1. Robertson, H. E., and Chesley, A. J. Pathology and bacteriology of acute anterior poliomyelitis. *Arch. Int. Med.* **6**:233-269, 1910.
2. Hertz, A. F., Johnson, W., and Depree, H. T. Case of polio-encephalomyelitis associated with optic neuritis and myocarditis. *Guy's Hosp. Rep.* **67**:105-107, 1912.
3. Saphir, O., and Wile, S. A. Myocarditis in poliomyelitis. *Am. J. M. Sc.* **203**:781-788, 1942.
4. Saphir, O. Visceral lesions in poliomyelitis. *Am. J. Path.* **21**:99-109, 1945.
5. Peale, A. R., and Lucchesi, P. F. Cardiac muscle in poliomyelitis. *Am. J. Dis. Child.* **65**:733-738, 1943.
6. Dublin, W. B., and Larson, C. P. Pathologic findings in poliomyelitis. *Am. J. Clin. Path.* **13**:15-17, 1943.
7. Dolgopol, V. B., and Cragan, M.D. Myocardial changes in poliomyelitis. *Arch. Path.* **46**:202-211, 1948.
8. Ludden, T. E., and Edwards, J. E. Carditis in poliomyelitis: anatomic study of thirty-five cases and review of literature. *Am. J. Path.* **25**:357-381, 1949.
9. Luhan, J. A. Epidemic poliomyelitis: some pathologic observations on human material. *Arch. Path.* **42**:245-260, 1946.
10. Clawson, B. J. Cited by Bell, E. T. Progressive pathology of poliomyelitis. In *Poliomyelitis*. 360 pp. Philadelphia: J. B. Lippincott Co., 1949. P. 140.
11. Abramson, H. L. Pathologic report on forty-three cases of acute poliomyelitis. *Arch. Int. Med.* **22**:312-330, 1918.
12. Cowie, D. M., Parsons, J. P., and Lowenberg, K. Clinico-pathologic observations on infantile paralysis. *Ann. Int. Med.* **8**:521-551, 1934.
13. Larson, C. P. Pathology of poliomyelitis. *Northwest Med.* **40**:448-450, 1941.
14. Spain, D. M., Bradess, V. A., and Parsonnet, V. Myocarditis in poliomyelitis. *Am. Heart J.* **40**:336-344, 1950.
15. Battro, A., Cibils, A. R., and Medez, J. C. Cited by Dolgopol and Cragan.[7]
16. Gefter, W. I., Leaman, W. G., Jr., Lucchesi, P. F., Maher, I. E., and Dworin, M. Heart in acute anterior poliomyelitis. *Am. Heart J.* **33**:228-239, 1947.
17. Boucek, R. J. Bailey, A. A., Burchell, H. B., and Edwards, J. E. Myocardial disease in acute poliomyelitis. *Proc. Staff Meet., Mayo Clin.* **24**:495-500, 1949.
18. Bradford, H. A., and Anderson, L. I. Electrocardiographic observations during poliomyelitis epidemic. *Ann. Int. Med.* **32**:270-278, 1950.
19. Grulee, C. G., Jr., and Panos, T. C. Epidemic poliomyelitis in children: clinical study, with special reference to symptoms and management of bulbar polioencephalitis. *Am. J. Dis. Child.* **75**:24-39, 1948.
20. Minnesota Poliomyelitis Research Commission. Bulbar forms of poliomyelitis. I. Diagnosis and correlation of clinical with physiologic and pathologic manifestations. *J. A. M. A.* **134**:757-762, 1947.
21. Platou, R. V. Discussion of Bell, E. T. Progressive pathology of poliomyelitis. In *Poliomyelitis*. 360 pp. Philadelphia: J. B. Lippincott Co., 1949. P. 155.

THE ANALGESIC EFFECT OF DROMORAN HYDROBROMIDE (3-HYDROXY-N-METHYL MORPHINAN HYDROBROMIDE) IN POSTOPERATIVE PAIN*

ERIK KEUTMANN, M.D.,† AND FRANCIS F. FOLDES, M.D.‡

PITTSBURGH, PENNSYLVANIA

A new synthetic morphine analogue, Dromoran Hydrobromide,§ has recently been introduced into clinical medicine. The chemical formula of Dromoran Hydrobromide is 3-hydroxy-N-methyl morphinan hydrobromide. For the sake of brevity, the compound will be referred to hereinafter as "Dromoran." It was synthesized by Schnider and Grüssner[1] in the laboratories of the Hoffmann–La Roche Company in Switzerland, and its pharmacologic properties were studied by Randall and Lehmann.[2] The analgesic effect of Dromoran in man was studied by Junkerman, Heen and Pohle,[3] Tidrick and others,[4] Gross and others,[5] Zager and others[6] and Curreri, Gale and Dickie.[7] Zager and others[8] and Lee and Hasegawa[9] have determined the extent to which the drug raises the threshold of pain. The compound was used for preoperative preparation by Theye, Stoelting and Graf,[9] and for the supplementation of nitrous oxide anesthesia by Brotman and Cullen.[10] The respiratory effects of Dromoran were studied by De Boer and Foster.[11] Its action on smooth muscle was observed by Gross and Featherstone[12] and Gruber, Gruber and Lee.[13] Its addictive liabilities were investigated by Flanary and others.[14]

TABLE 1. *Age Distribution of Patients.*

AGE	ALL CASES		DROMORAN		MORPHINE SULFATE	
	NO.	%	NO.	%	NO.	%
yr.						
0–10	0		0		0	
11–20	15	2.4	8	2.6	7	2.2
21–30	67	10.7	31	10.0	36	11.6
31–40	120	19.3	62	20.0	58	18.6
41–50	211	34.0	100	32.2	111	35.6
51–60	135	21.7	73	23.4	62	19.9
61–70	68	10.8	34	10.9	34	10.8
71–80	7	1.1	3	0.9	4	1.3
81–90	0		0		0	
Totals	623		311		312	

The purpose of this study was to compare the analgesic effect of Dromoran with that of morphine in postoperative pain, in a large number of patients. Side effects were also carefully observed and recorded.

*From the departments of Anesthesiology, Mercy Hospital and the University of Pittsburgh School of Medicine, Pittsburgh.

†Anesthetist, Ortopedisk Hospital, Copenhagen, Denmark; formerly, fellow in anesthesiology, Mercy Hospital, Pittsburgh.

‡Assistant professor of anesthesia, University of Pittsburgh School of Medicine; director of anesthesia, Mercy Hospital, Pittsburgh; consultant in anesthesiology, Deshon Veterans Hospital, Butler, Pennsylvania.

§The Dromoran (R.M.) Hydrobromide used in this study was made available through the courtesy of Dr. R. J. Floody of Hoffmann-La Roche Inc., Nutley, N. J. Part of the expenses were defrayed by a grant from the Hoffmann-La Roche Company.

MATERIAL AND METHODS

Our observations were made on 623 surgical patients. Of this number, 311 patients received 1336 subcutaneous injections of 5 mg. of Dromoran each, and 312 patients were given 1097 10-mg. doses of morphine sulfate, also injected subcutaneously. The patients who received Dromoran and morphine sulfate respectively were carefully paired with regard to age, sex, and operative procedure. Table 1 shows the age distribution of the patients, and Table 2 presents the incidence of the various operative procedures in both groups.

A mimeographed sheet was attached to the chart of every patient included in this study. The choice of the analgesic drug, the name, sex, weight, hospital number, and anesthesia number of the patient, as well as the date, surgical procedure, and the name of the surgeon were indicated on this study sheet. The ward nurses were instructed to observe and record the date and hour of administration, the effectiveness of the medication, and the possible side effects. An analgesic drug was administered only when the patients were in pain and asked for it. The resulting pain relief was recorded as: (a) complete, when the patient had no pain for three hours or more, (b) moderate, when complete

TABLE 2. *Types of Operations.*

	DROMORAN		MORPHINE SULFATE	
	NO.	%	NO.	%
Thyroidectomy	3	0.9	3	0.9
Thoracotomy and thoracoplasty	17	5.5	17	5.5
Gastric resection	12	3.9	13	4.2
Cholecystectomy	62	19.9	62	19.7
Incisional and ventral herniorrhaphy	14	4.5	14	4.5
Abdominoperineal resection and colectomy	11	3.5	11	3.5
Appendectomy	13	4.2	13	4.2
Inguinal herniorrhaphy	35	11.2	37	11.8
Hysterectomy	51	16.4	49	15.7
Vaginal plastic and hysterectomy	6	1.9	6	1.9
Vaginal plastic	12	3.9	11	3.5
Nephrectomy	4	1.3	4	1.3
Nephro-pyelo-uretero-lithotomy	10	3.2	10	3.2
Suprapubic prostatectomy	7	2.2	7	2.2
Hemorrhoidectomy	6	1.9	5	1.6
Laminectomy	12	3.9	12	3.9
Hip nailing and hip reconstruction	4	1.3	4	1.3
Arthrotomy of knee	4	1.3	5	1.6
Miscellaneous*	28	9.0	29	9.3
Totals	311		312	

*The "miscellaneous" group includes: repair of diaphragmatic hernia, excision of pilonidal cyst, open reduction of tibia, open reduction of ankle, open reduction of humerus, amputation of leg, cesarean section, hydrocelectomy, orchidectomy, mastectomy, spinal fusion, sympathectomy and multiple vein ligation.

or almost complete relief was obtained for less than three hours, (c) slight, with partial relief for less than three hours and (d) none. The following side effects were looked for: dizziness, nausea, vomiting, diaphoresis, dryness of mouth, anorexia, pruritus, weakness, headache, drowsiness, "grogginess," confusion, visual disturbances, tachycardia and chills. The nurses were instructed to look for objective signs, and to allow the patients to volunteer information about their symptoms, when evaluating the side effects. After the patients were discharged, the study sheets were returned to the anesthesia department and the data analyzed.

Results

The summary of our findings is presented in Table 3.

The rapidity of onset of the analgesic action of Dromoran was about the same as that of morphine, but its duration was somewhat longer. The first postoperative dose of Dromoran afforded complete relief in 66.5 per cent of the cases, as compared with 46.2 per cent after morphine. While morphine produced no effect in 5.8 per cent of the patients, the incidence of failure with Dromoran was 2.6 per cent. In evaluating the effect of all doses, it was also found that Dromoran gave complete relief in a higher percentage of the patients than morphine, and that the incidence of failure was less with Dromoran than with morphine.

With regard to side effects, the incidence of diaphoresis and drowsiness was higher, and the incidence of nausea and vomiting lower, with Dromoran than with morphine. There was no significant difference between the two drugs as far as other side effects were concerned.

Table 3. *Summarized Findings.*

	Dromoran		Morphine Sulfate	
No. of cases	311		312	
Total no. of doses	1336		1097	
Average no. of doses per patient in 1st 24 hr.	2.1		2.3	
Average total no. of doses per patient	4.0		3.4	
Relief from first dose:	No.	%	No.	%
Complete	207	66.5	144	46.2
Moderate	65	20.9	105	32.0
Slight	31	10.0	50	16.0
None	8	2.6	18	5.8
Average duration of 1st dose	6.1 hr.		5.8 hr.	
Relief from all doses:	No.	%	No.	%
Complete	1004	75.0	601	54.7
Moderate	231	17.4	333	30.3
Slight	80	6.0	128	11.7
None	21	1.6	35	3.3
Side effects of first dose:	No.	%	No.	%
Dizziness	5	1.6	5	1.6
Nausea	26	8.4	38	12.2
Vomiting	11	3.5	25	8.0
Diaphoresis	66	21.2	53	17.0
Dryness of mouth	15	4.8	5	1.8
Anorexia	1	0.3		
Pruritus	3	1.0	6	2.0
Weakness	8	2.6		
Headache	2	0.6	5	1.8
Drowsiness	24	7.7	17	5.5
Grogginess	7	2.2	1	0.3
Mental confusion	3	1.0	2	0.6
Visual disturbance	2	0.6	1	0.3
Tachycardia			2	0.6
Chills			1	0.3
	No.	%	No.	%
No. of side effects of all doses	317	23.7	236	21.5

Comment

The difficulties encountered in the evaluation of new analgesic drugs have been emphasized recently by Denton and Beecher.[15] Many problems confront the investigator who wants to study the effectiveness of a new agent in postoperative pain. To mention some, there is a marked difference in the pain sensitivity and in the reactions evoked by the same pain sensation in various individuals. Differences in personality and in the intellectual and emotional backgrounds of the observers present another variant. The methods advocated for the study of analgesic agents have been numerous, which might indicate that none of them is perfect. The recommendations of Denton and Beecher[15] have much to offer but can only be carried out under special circumstances, which would practically exclude clinicians from the study of this primarily clinical problem. In this study an effort has been made to compensate for the many variants involved by relying on relatively large numbers, and by pairing our cases with regard to operative procedure, age and sex. The figures of Tables 1 and 2 show that our cases were well paired with regard to age, sex and operative procedures.

A new agent, in order to be properly evaluated, must be compared with some other reliable drug. Morphine was chosen as a standard of comparison because its properties are well known and because it has been used more frequently than any other agent for the relief of postoperative and traumatic pain. Our data indicate that 5 mg. Dromoran given subcutaneously compares favorably with 10 mg. of morphine given in the same fashion. Dromoran gave complete pain relief in a considerably larger percentage of cases than did morphine; and with Dromoran the incidence of the most troublesome side effects, nausea and emesis, was decreased.

Several patients received Dromoran for prolonged periods. One patient who had extensive postoperative thrombophlebitis following spinal fusion received 45 doses of Dromoran in sixteen days. In no case were there any signs of increasing tolerance of or habituation to Dromoran.

In agreement with Tidrick and others,[4] it was found that a considerable number of patients who were originally to be included in the study did not require any analgesic agent for postoperative pain after major surgical procedures.

Summary

Dromoran (5 mg.) and morphine sulfate (10 mg.) were administered subcutaneously to 311 and 312 patients respectively, for postoperative pain.

The first postoperative dose of Dromoran gave complete relief in 66.5 per cent of the cases, as compared to 46.2 per cent with morphine sulfate.

Following 1336 injections of Dromoran, complete relief was obtained in 75.0 per cent of cases; after 1097 injections of morphine sulfate, complete relief was obtained in 54.7 per cent.

The average duration of analgesia produced by Dromoran (5 mg.) was 6.1 hours, as compared with 5.8 hours with morphine sulfate (10 mg.).

The incidence of nausea and emesis was less with Dromoran than with morphine.

References

1. Schnider, O., and Grüssner, A. Synthese von Oxy-morphinanen. *Helvet. chim. acta* **32**:821-828, 1949.
2. Randall, L. O., and Lehmann, G. Analgesic action of 3-hydroxy-N-methylmorphinan hydrobromide (NU-2206). *Federation Proc.* **9**: 217, 1950.
3. Junkerman, C. L., Heen, R. C., and Pohle, H. W. Clinical experience with new analgesic agent. *Proc. Central Soc. Clin. Research* **22**: 43, 1949.
4. Tidrick, R. T., Zager, L. L., Eastwood, D. W., Wilkins, D. S., and Jaggard, R. S. Control comparison of NU-2206 (3-hydroxy-N-methyl-morphinan hydrobromide) with morphine sulfate for relief of postoperative pain. *Proc. Central Soc. Clin. Research* **22**: 85, 1949.
5. Gross, E. G., Brotman, M. A., Nagyfy, S. F., Sawtelle, W. W., and Zager, L. L. New potent analgesic agent. *Federation Proc.* **8**: 297, 1949.
6. Zager, L. L., Sawtelle, W. W., Gross, E. G., Nagyfy, S. F., and Tidrick, R. T. Observations on use of new analgesic, NU-2206 (3-hydroxy-N-methylmorphinan hydrobromide). *J. Lab. & Clin. Med.* **34**:1530-1537, 1949.
7. Curreri, A. R., Gale, J. W., and Dickie, H. A. Effectiveness of Dromoran (3-hydroxy-N-methyl morphinan) as analgesic in thoracic surgery. *J. Thoracic Surg.* **20**:90-96, 1950.
8. Lee, R. E., and Hasegawa, A. K. Human analgesic testing of experimental drugs: Nisentil (Nu-1196) and Nu-2206. *J. Pharmacol. & Exper. Therap.* **98**:20, 1950.
9. Theye, R. A., Stoelting, V. K., and Graf, J. P. Use of Nu-2206 (3-hydroxy-N-methyl morphinan) for preoperative medication. *J. Pharmacol. & Exper. Therap.* **98**:31, 1950.
10. Brotman, M., and Cullen, S. C. Intravenous supplementation during nitrous oxide anesthesia. II. Comparison of morphine, meperidine and new potent analgesic (Nu-2206) with application of multiple covariance analysis. *J. Pharmacol. & Exper. Therap.* **98**: 4, 1950.
11. De Boer, B., and Foster, R. H. K. Respiratory depression in rabbits following administration of Nu-2206, morphine sulfate and piperidine analgesics. *J. Pharmacol. & Exper. Therap.* **98**:6, 1950.
12. Gross, E. G., and Featherstone, R. M. Studies on some smooth muscle effects of 3-hydroxy-N-methylmorphinan hydrobromide (Nu-2206). *Federation Proc.* **9**:279, 1950.
13. Gruber, C. M., Jr., Gruber, C. M., and Lee, K. S. Effect of certain analgesics upon intestine and uterine smooth muscle. *Federation Proc.* **9**:279, 1950.
14. Fraser, H. F., Flanary, H. G., Houde, R. W., and Isbell, H. Addiction liabilities of some drugs in morphine series. *Federation Proc.* **9**:273, 1950.
15. Denton, J. E., and Beecher, H. K. New analgesics. I. Methods in clinical evaluation of new analgesics. *J. A. M. A.* **141**:1051-1057, 1949.

Q FEVER

Report of a Case in Massachusetts

FRANCIS P. VOSE, M.D.*

WOONSOCKET, RHODE ISLAND

SINCE the initial paper on Q fever[1] was published, epidemics and scattered cases within the United States have been reported from California, Texas, Illinois, Virginia and Pennsylvania.[2-6] No naturally occurring cases have been reported from the New England area. This case is of some interest because of its possible occupational nature.

Case Report

F. M. was a 39-year-old white wool handler who previously had been in excellent health. On May 15, 1950, he had a shaking chill and generalized muscular aches followed by daily shaking chills. He was first seen on the 8th day after the onset of the illness. At that time his temperature was 100°F. orally, and he was sweating profusely. The pulse was 88, full and regular. The blood pressure was 142/86. The pharynx was lightly injected. The pupils reacted normally to light and accommodation. The optic fundi were not unusual. Both gingivitis and considerable dental caries were found. There were no palpable cervical lymph glands. The patient said that extreme forward flexion of the neck was slightly painful. The heart sounds were not unusual; the rate was rapid, the rhythm was regular; no enlargement was noted. The lung fields were resonant throughout. Fine crepitant rales were audible posteriorly at the right lung base but were absent after cough. The abdomen was soft; the liver and spleen were not palpable. No areas tender to deep palpation were noted. The genitalia were normal. On rectal examination, the prostate gland was not enlarged or tender. No joint signs or symptoms were elicited. The circulation to the extremities was adequate. Deep and superficial reflexes were active, equal and normal. The Kernig and Babinski signs were not elicited. The urine specific gravity was 1.024, the reaction acid, sugar and albumin negative. Microscopical examination showed a rare granular cast. The white-cell count was 8600.

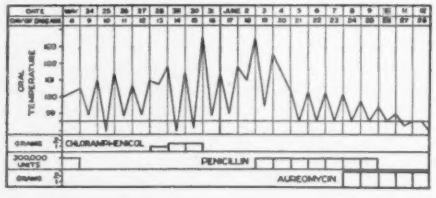


FIGURE 1. *Effect of Antibiotics on the Temperature.*

The patient continued to have daily chills, and the temperature followed the course shown in Figure 1. On the 12th day the white-cell count was 12,400, with 56 per cent neutrophils, 24 per cent lymphocytes and 20 per cent monocytes. The sedimentation rate was 30 mm. in 60 minutes. An x-ray film of the chest taken on the 12th day showed prominent bronchial markings at both bases. A second chest x-ray film, taken 70 days after the onset of the illness, was normal. Serological examinations taken on the 18th day were negative for typhoid O, typhoid H and paratyphoid A and B; the Weil–Felix reaction was negative. The brucella agglutination was negative. The blood smear was negative for malarial parasites. The complaint of stiff neck was absent after the 11th day. No further chest signs were noted after the 11th day.

The patient was given salicylates and 300,000 units of penicillin-procaine in oil on the 8th day. Beginning late on the 13th day and continuing through the 14th and 15th days, chloramphenicol, 0.25 gm. every 4 hours, was given orally. Since the patient complained of the expense, and since little

*Member, outpatient staff, Woonsocket Hospital, Woonsocket, Rhode Island.

alteration in the fever was noted, the chloramphenicol was discontinued after a total of 4 gm. had been given. Beginning on the 19th day and continuing through the 25th day, daily doses of 300,000 units of penicillin-procaine in oil were given intramuscularly. On the 24th day 0.5 gm. of aureomycin every 4 hours was started, and continued through the 28th day — a total dose of 15 gm.

Between the 25th and 28th day, the temperature gradually returned to normal. On the 27th day, blood serum was sent to the National Institute of Health Laboratories for a Q fever agglutination test, but was damaged in transit. The sedimentation rate at this time was 16. mm in 60 minutes, and the white-cell count was 7600.

On the 35th day after the onset of the illness, a second sample of blood serum was submitted, and was reported positive for Q-fever complement fixation in a dilution of 1:1024. A second specimen, submitted 70 days after the onset, was reported positive in a dilution of 1:4096. On both these occasions the Weil–Felix, murine typhus, Rocky Mountain spotted fever and rickettsial-pox complement-fixation tests were reported negative. A seco[illegible] brucella agglutination test was also reported negative

Throughout the illness the [illegible]d few complaints, other than the daily tempe[illegible]re [illegible], which were followed by drenching swea[illegible]. Duri[illegible]llness he lost approximately 38 pounds. No [illegible] temperature above normal was noted for one [illegible]he 27th day.

Discus[illegible]

This patient worked in a [illegible]rting plant in a town in southern Massachuse[illegible]r to his illness. The wool handled by the em[illegible]f this company is raw, untreated fleece [illegible], so far as can be determined, in Califor[illegible]xas. The burlap bags of wool were opened and the contents sorted and graded by hand and then repacked in bags for shipment elsewhere. Large amounts of foreign matter are found in the wool, and considerable dust is released during the sorting and bagging. It is interesting to note that another case[6] is reported in the American literature as occurring in a wool handler in Pennsylvania.

This case had an unusually protracted febrile period of twenty-seven days. Huebner and others,[7] in a recent review, state that the fever persists for a maximum of fifteen days, whereas Denlinger[5] reported a febrile period of twenty days in one of his 80 cases. Denlinger also reported meningeal symptoms in 20 per cent of his cases.

The effect of the three antibiotics used in the treatment of this case is not clear. The chloramphenicol was used in very small dosage, whereas the aureomycin was apparently given during the lysis of the fever.

Summary

A case of Q fever proved by serological examination is described.

The possibility that this fever may be an occupational hazard of wool handlers is presented.

175 Harris Avenue

References

1. Derrick, E. H. "Q" fever, new fever entity: clinical features, diagnosis and laboratory investigation. *M. J. Australia* **2**:281-299, 1937.
2. Cox, H. R., Tesar, W. C., and Irons, J. V. Q fever in United States. IV. Isolation and identification of rickettsias in outbreak among stock handlers and slaughterhouse workers. *J. A. M. A.* **133**:820, 1947.
3. Straus, E., and Sulkin, S. E. Q fever: present status in United States. *Texas State J. Med.* **44**:214-217, 1948.
4. Shepard, C. C. Outbreak of Q fever in Chicago packing house. *Am. J. Hyg.* **46**:185-192, 1947.
5. Denlinger, R. B. Clinical aspects of Q fever in southern California: study of 80 hospitalized cases. *Ann. Int. Med.* **30**:510-527, 1949.
6. Janton, O. H., Bondi, A., Jr., and Sigel, M. M. Q fever: report of case in Pennsylvania. *Ann. Int. Med.* **30**:180-184, 1949.
7. Huebner, R. J., Jellison, W. L., and Beck, M.D. Q fever: review of current knowledge. *Ann. Int. Med.* **30**:495-509, 1949.

FIFTY YEARS OF MEDICAL PROGRESS

MEDICINE AS A SOCIAL INSTRUMENT: PUBLIC HEALTH

Haven Emerson, M.D.*

NEW YORK CITY

"TO BUILD a better tabernacle for the soul of man to inhabit." Such was the ambition of Sir George Newman, a notable contributor to the purposes, methods and results of public-health services in Great Britain in the first quarter of the twentieth century. An evangelistic spirit of sorts lies not far below the surface in that interprofessional team that we call a health-department staff. Without the glint of eye, the uplifted chin, and the visionary's words and acts, man's redemption of man — as Dr. Osler presented it in his lay sermon to the students of the University of Edinburgh in 1910 — can be but a drab undertaking by professional promoters of organized philanthropy:

> The new socialism of Science, with its definite mission, cares not a rap for the theories of Karl Marx, of Ferdinand Lassalle, or of Henry George; still less for the dreams of Plato or of Sir Thomas More — or at least only so far as they help to realize the well-being of the citizen. . . .
>
> The outlook for the world, as represented by Mary and John, and Jennie and Tom, has never been so hopeful. There is no place for despondency or despair. As for the dour dyspeptics of mind and morals who sit idly croaking like ravens, — let them come into the arena, let them wrestle for their flesh and blood against the principalities and powers represented by bad air and worse houses, by drink and disease, by needless pain, and by the loss annually to the state of thousands of valuable lives — let them fight for the day when man's life shall be more precious than gold. Now, alas! the cheapness of life is every day's tragedy!

To the physician serving the sick, as to the health officer concerned with the prevention of disease, the Greek philosopher Prodicus proclaimed the essence of our belief: "That which benefits human life is God."

*Professor of public-health practice, emeritus, Columbia University College of Physicians and Surgeons.

As science has widened our knowledge, we have seen that human nature reacts in 1951 as it did in the ancient centuries when "the people at large were haunted by fear and anxiety, stricken by the pestilence of the darkness and the sickness of the noonday."

Our latest and (as it would seem to the elders of medicine) our shortest, or at least most hurried, fifty years leave us faced with an age-old struggle and a definite failure to put science to work through the two resources we acknowledge as proper for self-determining people who have chosen to live under a form of government representative of universal suffrage: namely, the authority of the law and the pervasive influence of popular education. We continue to lag in performance — in practical application of the biological sciences to our own survival and to improvement of the quality and length of life.

Is it not true that we have achieved our present creditable state of nationwide health by recourse to none other than these modalities, if you will, of the democratic pattern of civil government?

The general ignorance of our people of the natural history of the reproduction, growth and development of man, and of the structures and functions that constitute each physical and emotional individuality, has been receding before the gently insistent pressure of information about the laws of right living, the persuasiveness of demonstrable fact and the immediately available evidence that results in means of survival. The satisfactions of life's depth and breadth, as well as its length, follow upon observance of the ways of living matter as learned and taught by physicians, nurses, dentists, nutritionists and a host of other disciples of human biology.

When education fails to protect some of us against the cupidity, indifference, carelessness or ignorance of others, we trust the police power of the state to intervene — and yet always with patience and gentleness, and only in the interest of a proved necessity, and for ends so clear as to be convincing to any judge and jury, if challenged.

From being a term of rather ambiguous meaning, public health has acquired definitions that are fairly sharp, although of wide variety. Of these, let me offer one of some brevity, which, however, comprehends all so far undertaken in the name of public health and appears ample for the foreseeable future.

Public-health services consist of the application of the sciences of preventive medicine through civil government, or with its expressed consent, for social ends.

Health — wholesomeness of life — is a personal experience and is, in the simplest terms, the composite or end result of the genetic or hereditary qualities of the individual, the environmental setting or surroundings to which adjustment must be made (so far as they affect the health of the individual) and the personal conduct or chosen way of life that each person follows day by day, from birth to death.

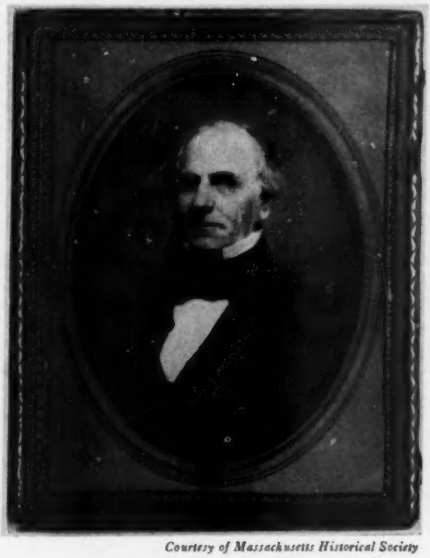
Public health applies to the crowd, the community, the aggregate of families, homes, shops, schools and manufacturing activities that lie in some jurisdiction of local government in the social sense. Personal health is an accomplishment, and an achievement — not a gift from a department of government, nor even a right to be demanded from society, but rather an opportunity, a goal to be attained by a combination of personal endeavor and the help of the local health services. A community of people, or their professional advisers, become aware of hindrances or hazards to health as the result of reports of sicknesses and deaths. A board and a department of health are authorized, funds appropriated, functions listed, personnel employed — and the local civil government becomes an agent in the application of the sciences of preventive medicine through sanitary authority and health education.

Health is not the mere absence of disease or ill health. It is not intelligent or helpful, in discussion of public health as an instrument of social progress, to refer to medical care (that is, diagnosis, treatment and perhaps also prevention of sickness in the individual) as a public health service. There are two quite distinct fields of administrative medicine: the specialty of medical care and the specialty of public health.

The purpose of medical care is to bring to the sick person, or to any who fear sickness, or to any person needing relief from pain, suffering or other disability, all appropriate skills and arts of medical science applicable to the uniquely particular individual concerned. By reason of the very nature of disease, accident, disability, pain or injury, and because of the nature of biologic variation of individuals, the care of the sick, to be most beneficial, must be concentrated and personalized, and is ideally a continuous resource throughout the life of the one person, the patient. No two persons are alike; the same disease is manifested differently in each of its victims. The very essence of the practice of medicine is the focusing of all knowledge, history, medical examination and laboratory aids upon the one patient seeking care. The care sought may be guidance in retaining or developing better health, or in relieving uncertainty about the feared or suspected presence of illness or of approaching deterioration of body or mind. The patient may be well, and not know it — or he may be sick, and believe himself well. The answer made by the physician is for this patient alone, and there is no certainty that an identical concatenation of determining factors will ever recur in the experience of the physician or of the patient.

This is medical care — whether undertaken by the physician solely responsible, or administered by the institution or agency served by an organized

staff or group of physicians and others. This type of medical care has nowhere been undertaken successfully by government agencies, or by any persons not directly responsible to the patient and to the medical profession. It is for the expenses of personal medical care that schemes of the nature of insurance have been devised. Actuarially sound, thrifty voluntary plans, benefiting patients, hospitals and physicians, nurses and dentists, are available for the prepayment of medical care. Such plans are to be wholeheartedly promoted in the interest of personal health and of co-operative economy. What has been called "Health Insurance" since 1911 in Great Britain offers neither health nor insurance, but a tax-supported compulsory system



Courtesy of Massachusetts Historical Society

FIGURE 1. *Lemuel Shattuck.*

of medical care for the sick. There is no vestige of health benefit or promise of health betterment to be found in any such compulsory systems of government-supported medical care now in effect in other countries or as currently proposed in the United States. There are two means by which, in our country, for about a century, medical knowledge has been made available — and these are properly defined as Medical Care and Public Health.

Other papers in this series — by authors better informed than I — deal with the sciences and arts of medical care and the measures taken to bring these within the means of a wide variety of incomes. I see great benefits to patient and doctor to be gained from widespread adoption of prepayment plans voluntarily undertaken by consumer and producer, patients and doctors — and controlled by government only in respect to actuarial soundness and fiduciary responsibility of the contracting parties as required by law. This is not public health.

Health of the individual, the community, the state or the nation cannot be contracted for, but

FIGURE 2. *Henry Ingersoll Bowditch.*

investment in the sciences of preventive medicine by civil government at any level, or of any size, is an obligation made possible and necessary by the history of the past hundred years of western civilization.

The public was warned, in 1842 in Great Britain by Edwin Chadwick, and in 1850 in the United States by Lemuel Shattuck — and again in 1876 by Henry I. Bowditch — that pestilences were sapping the strength of nations, that some of the causes were well enough understood to demand action, and that public authority had an obvious responsibility to do for the people as a whole what neither householder nor other citizen, physician, or parent could do or require neighbors to do in the public interest. The logic of the situations brought about the first National Health Act of Great Britain in 1848 and the creation of the first State Boards of Health of Louisiana and of Massachusetts in 1858, and of the Metropolitan Board of Health of New York in 1865.

While public enlightenment was stressed as an essential factor in the achievement of a decent level of community cleanliness, whether rural or urban, emphasis was placed, at this very beginning

of modern public-health supervision, upon the exercise of public authority with respect to man's environment and to the isolation and quarantine of pestilential diseases.

Until shortly before 1900, little reference is to be found in reports of Boards of Health to any activities except those of enforcement — the exercise of police power for abatement of sanitary nuisances, for protection of communities against epidemics that threatened by sea or land and for partial reduction of the exposure of well persons to carriers of infection in school, shop and family.

In this country the tradition of the use of proclamation against introduction of pestilence by sea was well established, apparently dating back to about 1655, and was enforced by arms at the port of Boston against ships coming from yellow fever ports and against smallpox originating in Jamaica on more than one occasion in colonial times.

It is not surprising that the first era of public health in this country, during the last half of the nineteenth century and the triumphs in Havana and Panama in the first quarter of the twentieth century, was dominated by sanitary law and ordinance, by the exercise of the police powers of states and cities, in the interest of improving man's physical environment, abatement of nuisances of waste disposal, offensive smells and insanitary management of slaughterhouses and the sanitary control of the milk industry. Water, sewage and industrial waste disposal and insect and animal pests came early under public-health control. A new phase of public health, which had its origins from approximately 1890 to 1922 in the antituberculosis movement, was marked by the leadership of clinicians not previously active in public health. Local committees for the study and prevention of tuberculosis in Philadelphia, Baltimore, New York and Boston had by 1900 come to a common conclusion that in dealing with a disease of such frequency and universal distribution as tuberculosis, the use of force for control should not be attempted, and that a campaign of public education should be undertaken. It was necessary to impress upon the public that pulmonary tuberculosis was communicable, preventable and curable. Here was a new medical statesmanship, in which everyone had a part to play, whether as teacher or learner.

The sanitary era has been a continuing and major factor, and will doubtless endure to play an essential role in community health — particularly in the tropics and throughout all of industry and gainful employment. There is no end in sight to the useful application of sanitary science for safeguarding man's environment. The educational phase can be dated at its start, but the end of its potentialities is not, nor should it be, visible even to those with a true vision of the future.

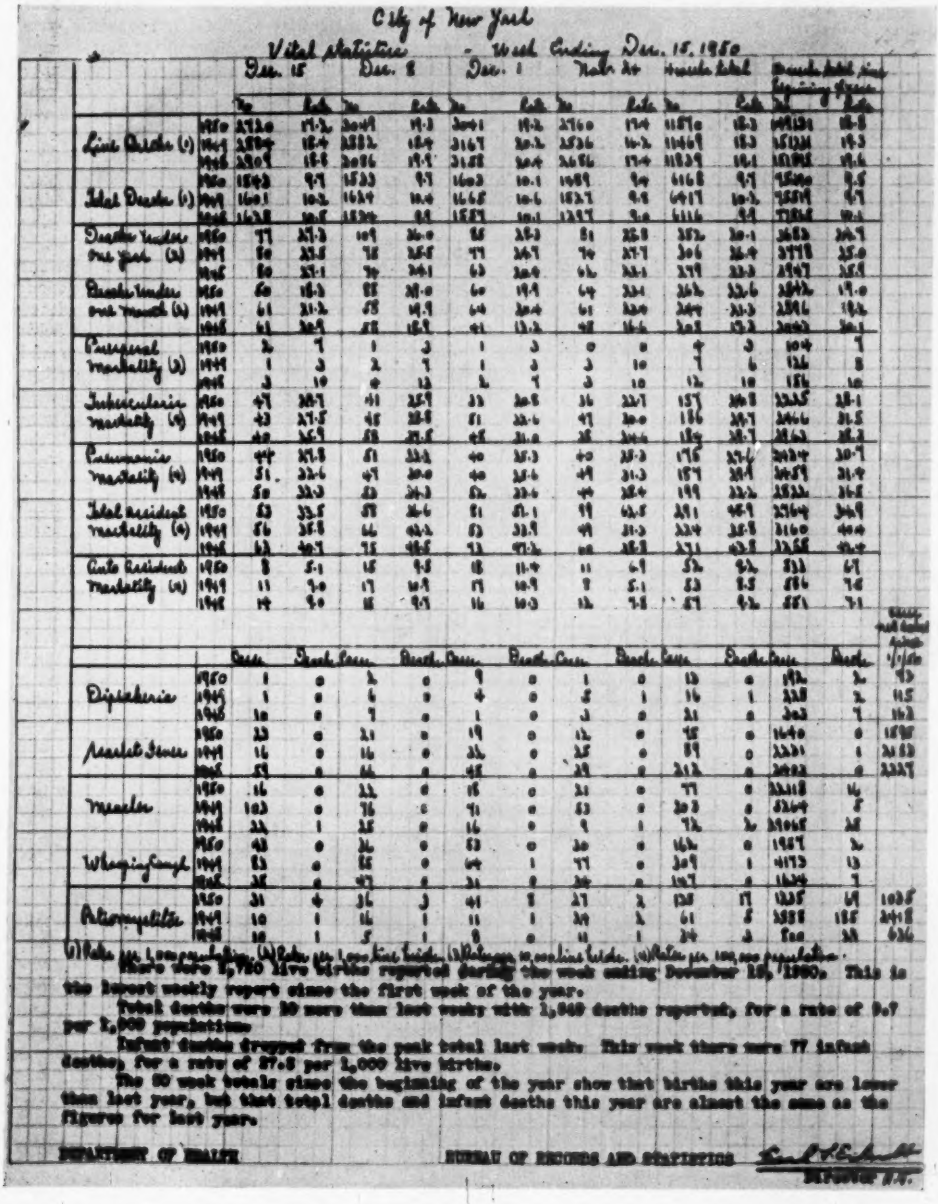
When the American Medical Association committed itself in 1922 to the promotion of the periodic medical examination of the presumably well, a third major era of public health began, which we may call that of universal personal participation.

We are in the midst of this at present, having advanced in the arts of diagnosis and in the epidemiology of disease to the point where the skilled physician can sense a threat of some diseases before the patient is warned by any symptom of disorder or ill health, and when we know that only before the declaration of manifest ill health can measures of relief or prevention of death or further distribution of the disease be offered with a promise of success.

It is this — the application of the physiological approach as a supplement to the traditional management of the pathologic state — that has revolutionized and given a new reality to the personal and public application of the medical sciences in the interest of health. It is not strange that some bearings have been lost and enthusiasms have gone astray in the process, but the great benefits that have come through the medical management of pregnancy, infancy, youth, the industrial worker, the civil servant, the men and women of the armed forces and the inmates of institutions cannot be gainsaid — nor need the partners, medical care and the service of health departments, suffer from any lack of credit; for much is due to each.

When the extent of prenatal care was studied in 1916 among the expectant mothers of New York City, hardly 4 per cent were found to be receiving even a moderate share of this most profitable of health protections. Today, with more than 99 per cent of deliveries occurring in hospitals, and with prenatal care a routine requirement for all women registered for hospital confinement, it has been found desirable to discontinue prenatal clinics operated by the health department, except in a few areas not well served by neighborhood hospitals.

What was first an advanced feature of good private obstetrics for the favored minority became a widely promoted activity under the supervision of health departments; it is by now so widely regarded as essential for all maternity patients that there is no further need for intensive education or comprehensive services on the part of official agencies. This and other great advances in obstetrics have illustrated the close and continuing collaboration between the organized profession of medicine and the health officer, with his clinical assistants, public-health nurses and health educators. The highly creditable maternal mortality rate of the United States as a whole (less than 1 maternal death per 1,000 live births in the past two years) is the tangible evidence of social progress through medical science. It would have been difficult to persuade a medical society in New York City in 1930 (when the maternal mortality was about 50 per 100,000 live births) that 150,000 live births could occur in 1950 among the nearly



City of New York

Vital statistics - Week Ending Dec. 15, 1950

		Dec. 15		Dec. 8		Dec. 1		Nov. 24		Cumulative total		Cumulative total since beginning of year	
		No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Live births (a)	1950	2,710	17.2	3,041	19.3	3,041	19.2	2,760	17.4	11,570	18.3	148,131	18.8
	1949	2,894	18.4	3,011	19.1	3,167	20.1	2,536	16.1	11,469	18.2	151,134	19.3
	1948	2,909	18.6	3,076	19.7	3,158	20.4	2,676	17.4	11,819	18.1	151,915	19.4
Total Deaths (b)	1950	1,543	9.7	1,533	9.7	1,603	10.1	1,489	9.4	6,168	9.7	75,880	9.5
	1949	1,601	10.2	1,614	10.4	1,645	10.6	1,523	9.8	6,417	10.1	75,519	9.7
	1948	1,638	10.5	1,570	9.8	1,573	10.1	1,393	9.0	6,174	9.8	77,856	10.1
Deaths under one year (c)	1950	77	27.3	109	36.0	85	28.3	81	28.8	352	30.1	3,683	24.9
	1949	80	27.5	78	25.5	77	24.7	74	23.7	309	26.4	3,778	25.0
	1948	80	27.1	79	24.1	63	20.0	64	22.1	279	23.3	3,947	26.6
Deaths under one month (d)	1950	60	18.3	88	28.0	60	19.9	64	22.1	252	21.6	2,672	18.0
	1949	61	21.2	58	18.9	64	20.4	61	23.0	244	21.2	2,841	18.8
	1948	61	20.9	58	18.4	51	16.2	48	16.4	218	17.3	2,883	19.1
Puerperal mortality (e)	1950	2	1	1	.3	1	.3	0	0	4	.3	104	1
	1949	1	.3	2	.7	1	.3	3	1.0	7	.6	116	.8
	1948	3	1.0	0	.0	2	.7	3	1.0	12	1.0	151	1.0
Tuberculosis mortality (f)	1950	49	18.7	41	15.9	33	12.8	34	13.1	157	13.8	2,345	18.1
	1949	43	17.5	45	18.8	51	21.4	47	19.0	186	16.7	2,466	21.5
	1948	42	16.9	53	21.6	45	18.0	38	15.4	178	15.7	2,643	18.3
Pneumonia mortality (g)	1950	44	16.8	51	19.8	40	15.3	40	15.3	176	15.4	2,434	18.7
	1949	51	21.4	49	20.0	40	15.4	49	21.3	189	16.4	2,459	21.9
	1948	58	23.0	53	21.3	54	21.4	44	18.4	199	17.4	2,532	21.5
Total accidents mortality (h)	1950	53	33.5	58	36.6	51	32.1	44	27.8	291	36.9	2,764	34.9
	1949	56	36.8	44	29.2	53	33.9	49	31.3	334	35.8	3,160	40.0
	1948	43	26.7	35	22.2	33	21.2	28	17.9	171	21.8	2,456	31.2
Auto accidents mortality (i)	1950	8	5.1	15	9.8	18	11.9	11	6.9	52	9.4	511	6.7
	1949	11	7.0	17	10.9	17	10.9	8	5.1	53	9.5	586	7.6
	1948	14	9.0	16	9.9	16	10.0	12	7.5	57	9.2	551	7.1

		Cases	Death. Cases	Cases	Death. Cases	Cases	Death. Cases	Cases	Death. Cases	Cases	Death. Cases	Cases	Death.	Weekly rate per 100,000 population
Diphtheria	1950	1	0	4	0	9	0	1	0	15	0	192	4	.13
	1949	1	0	4	0	4	0	5	1	14	1	338	3	.11.5
	1948	10	0	7	0	1	0	3	0	21	0	303	7	.163
Scarlet fever	1950	23	0	21	0	19	0	12	0	75	0	1,640	0	1.05
	1949	16	0	16	0	24	0	25	0	89	0	1,331	1	1.23
	1948	29	0	44	0	45	0	29	0	213	0	2,892	0	3.33
Measles	1950	14	0	33	0	15	0	21	0	77	0	33,118	4	
	1949	103	0	76	0	91	0	63	0	303	0	53,649	5	
	1948	33	1	25	0	14	0	9	1	73	2	31,965	25	
Whooping-cough	1950	43	0	34	0	53	0	30	0	164	0	1,967	2	
	1949	53	0	55	0	64	1	77	0	249	1	4,173	13	
	1948	35	0	47	0	31	0	34	0	147	0	1,834	7	
Poliomyelitis	1950	31	4	31	3	41	2	27	2	130	11	1,335	49	1.03
	1949	10	1	14	1	11	1	14	1	61	5	1,221	125	2.11
	1948	18	1	5	1	8	0	11	1	34	3	720	33	6.36

(a) Rate per 1,000 population. (b) Rate per 1,000 live births. (c) Rate per 1,000 live births. (d) Rate per 1,000 live births. (e) Rate per 100,000 population.

There were 2,710 live births reported during the week ending December 16, 1950. This is the lowest weekly report since the first week of the year.

Total deaths were 30 more than last week; with 1,543 deaths reported, for a rate of 9.7 per 1,000 population.

Infant deaths dropped from the peak total last week. This week there were 77 infant deaths, for a rate of 27.3 per 1,000 live births.

The 50 week totals since the beginning of the year show that births this year are lower than last year, but that total deaths and infant deaths this year are almost the same as the figures for last year.

DEPARTMENT OF HEALTH BUREAU OF RECORDS AND STATISTICS

REGISTRAR

FIGURE 3. *Sample Page of Weekly Vital Statistics from the Records of the Department of Health of New York City.*

8,000,000 people of this city of all races and nations, with a loss of no more than 7 maternal lives for each 10,000 such births.

However, this is no isolated instance of the obvious value of employing physicians as guides in and for personal health. The infant mortality of New York City in 1950 was 24.7 (deaths under 1 year per 1,000 live births) — attributable again to the co-operative services of physician and health department, the latter providing baby health guidance for the diminishing group of mothers who cannot afford the services of a physician of their own choice. Authority to demand safe water and pasteurized milk was as essential as minute guidance by the attending physician in the nutrition, growth and physical and emotional development of the individual child. The preschool, the school and adolescent children have similarly benefited from the team play between medical care and public health, the product of intelligent seeking of health by the family and the competence of an alert health department in providing protections available only through local government.

Even today we hear some of our medical colleagues rail against local health services as an entering wedge of "socialized medicine" and publicly declare their opposition to the extension of local units of health jurisdiction to cover the 40,000,000 of our fellow Americans who still lack this modest provision of protection in their communities. These are merely the leftover ideas and resentments of outmoded physicians who visualize their future not in change but in the fixing of their practice in a pattern that can no longer satisfy either society or science — either their personal patients or society at large.

The specialty of public health, as it is being developed, owes a greater debt to obstetricians, pediatricians and general family practitioners than to any or all of the voluntary health agencies, either local or national. It is the physician who accepted the immunization program against acute communicable diseases, and furthered the guidance of maternity, infancy and older childhood; and it will be the physician of the future who will bring some sanity into "mental hygiene," now too often a hodgepodge of concern for the mentally diseased and amateur psychiatry for the upper and lower strata of society.

If all this is approximately true, what is now and what is to be the role of the local health department during the remainder of our present century? What have been the broad strokes of development — leaving what tasks to be completed, what others to pass into history?

With almost mathematical precision, we can predict the progressive subsidence, as matters of first concern in public health, of the communicable diseases. Whether we think of scarlet fever (with but one death in the past three years in New York City), diphtheria (with but 2 each year in 1949 and 1950) and whooping cough (with but 2 deaths in 1950) or rehearse the stories of malaria, hookworm, trachoma, tuberculosis and syphilis in the past decade, we recognize the shrinking numerical importance of these ancient plagues in the public-health program of today. It is true that we have the common cold, epidemic poliomyelitis, measles and mumps — not to mention many other diseases for the control of which we await much new knowledge. However, from a position of major or almost exclusive importance, the communicable diseases are being pushed aside by other less calculable categories of preventable diseases, of which two are constant challenges to research, service and prevention: namely, disorders of nutrition and disabilities related to gainful occupations. These two, and the fields of mental health, cancer, caries of the teeth and the conditions of the later decades of life (particularly those of the circulatory system), face us with problems of administration and of balance between medical care and public health which will fill the next fifty years with trouble, perhaps some triumphs — certainly with many frustrations.

What are the structure and pattern of public-health services that we have developed to finish our uncompleted tasks and advance into new areas?

It seems quite safe to expect that the international efforts of the past thirty years toward some degree of comparability and uniformity of demographic data, for consultation or advisory and supplementary technical services to nations in need, for standardization of certain specific diagnostic, therapeutic and protective biological products and for desirable leadership in intercontinental health protection will continue, will be more effectively developed and will play a useful and welcome role.

However, since the World Health Organization can exercise no authority over the conduct of local or state health departments in the United States, we must base our plans on local community needs, not on global theories.

Again — unless invited by state and local government, our own federal health agencies cannot take part in providing communities with health protection or in prescribing functions or methods, except within the realms of interstate commerce and communication and in respect to international commerce or trade across our borders. No state can create the research, consultative and standardizing facilities, available in almost endless variety and at great cost to the taxpayers, that the federal health agencies now provide. Again, only through the power of federal grants-in-aid to states can local health departments be influenced to follow any other program than that which seems best to local government and public opinion, both lay and medical.

State health departments, indispensable as they are in their capacities of research, consultative,

supervisory, administrative and educational leadership, are still the authorizing power that stands behind the otherwise quite autonomous local health jurisdiction. The state health department can serve as the operating agent of local public health when the local government is negligent, or when the performance of required health services is so incompetent as to be a hazard to the health of neighboring communities.

All but five of our states have statutes authorizing the creation of county-wide, city-county, or multi-county local health jurisdictions. (As a matter of fact, there are now some 38,000 local health jurisdictions in the United States — although it probably would be more efficient and less costly to have no more than 1500.)

It appears, then, that any nation-wide application of the sciences of preventive medicine for social ends must be based on the least common denominator. This denominator, in the administrative sense, is the local health department, whose retail distribution of health information is likely to be most in accord with the people's needs, will be welcome, will be modest in cost and will reach the largest number of homes and families, schools and shops for the tax dollars expended.

At the risk of repetition for some of the readers of this article, let me sketch briefly the organization, personnel, functions, results and cost of the local health administrative unit, as commonly found where full-time medical leadership and a modest budget are provided.

Where there are at least 50,000 people within the jurisdiction of a local government, it is possible to support a modest health department (under a trained full-time medical health officer), a sanitary engineer and assistant, 10 public-health nurses and 3 clerks, at an annual per-capita cost to the community of not less than $1.50. Larger communities will find it possible to add specially qualified personnel for health education, maternity and child health, tuberculosis control, laboratory and dental facilities, mental-health education and other activities, together with an increase of nursing and sanitary field staff (at the same ratio to population) without any substantial rise in the per-capita cost to the community. To a nation that contributes about a dollar per capita annually to popular voluntary health agencies and spends not less than sixty-five dollars annually per capita for legally sold alcoholic beverages, the small sum needed to support a town or county health department is well within the means of all but the most economically and culturally backward areas of the continental United States.

The support of such a professionally directed and balanced health department for the carrying out of a well-rounded program is not a matter of preference or political choice. It is a primary and continuing social necessity, because of the dependence of the community, the physicians and patients, the mother, the school child, the self-supporting worker and all other persons upon the combined offices of medical care and public health. Each is weak and ineffective without the other. Neither can function alone without hazard to health in general.

The local health department and its staff are at least of the same order of importance as is the community general hospital, with its trustees, administrator and medical board.

Where the state has seen fit to charge the state or local health authorities with administrative responsibilities for medical care, as in Massachusetts for care of cancer patients, and in Maryland and Washington for the general medical care of persons on relief or temporarily indigent because of illness, creditable services have been provided, but with little or no gain to the people in terms of disease prevention. It is doubtful whether we can divert the activities of the department of public health to the management of existing disease without sacrificing the small resources thus far developed for prevention. What Dr. Bowditch said in his Centennial Discourse of 1875 applies as truly to public medicine today as it did then:

> I hold it to be true that the study of the prevention of disease is the only branch of medical learning which the state can legitimately undertake. The practice of medicine and surgery must be left to medical schools and the private practitioners of medicine. The state, as a student of the causes of all diseases, only supplements, and indeed nobly supplements them.

The basic functions of the local health department are few but indispensable. The health statistics — accounting for the human livestock — may be mentioned first, as it was from records of birth, sickness and death that public health emerged as a science and as a function of civil government.

Control of all types of preventable diseases, but first of all those of communicable character, has been second in origin as in importance. Sanitation of environment has followed, or rather accompanied, the evidence of vital statistics and the necessity of disease control. The health department's role in prevention of occupational diseases is in its early infancy. Its contributions in technics of production, processing and distribution will be of greater moment in the future than even now.

Without the diagnostic, analytical and biological laboratories of states and cities and even of many a well served county, the control of disease and the management of man's environment would lag far behind present-day knowledge. Every medical and health-science concern of a community is served by the public-health laboratory as by no other agency. It is the first recourse of all who seek the discovery of preventable illness and the verification of the success of specific measures of control.

These may be regarded as the four primary or authoritative functions of a local health department.

For guidance of maternity, infancy and child health, we rarely use authority, except such as is the product of the acknowledged competence of physicians and nurses in teaching the truths of human physiology and the rules of right living, for body and mind. Closely related to this, and in fact largely developing out of the success of the campaign for prevention of infant mortality in the first decades of the 20th century, is the still rather ill-defined function of public-health education. These latter activities first appeared as separate or new bureaus of local, and later of state, departments of health between 1900 and 1914.

Nowadays, every member of a health department, from the receptionist to the medical health officer or commissioner, seeks to serve as an educator, interpreter, distributor and promoter of human biology and practical health information.

If we accept the probability that in the next fifty years we shall move into other areas of public-health effort than those in which the past half century has recorded some substantial triumphs, health education, rather than sanitary law, must undergo a great increase in depth and breadth. We can teach, but cannot enforce, dietary intelligence. We can offer advice about the balanced diet and the family food budget, but often to deaf or unwilling ears.

There will surely be a great enlargement in the concern of management and labor with every last detail of occupational hygiene, of industrial sanitation, of the psychological analysis of job satisfactions and frustrations.

Our ignorance of the origins of cancer and the extravagant promises of prevention by its over-optimistic devotees (who mistake early recognition and good surgical care for a program of prevention), blind us to some extent when we consider the actual productiveness of overexploitation and try to distinguish between the postponement of death from, and the prevention of, cancer. We know some of the causes of preventable cancer, and may consider all occupational cancer preventable, but much of the hysterical promulgation among school children of so-called "cancer information" seems to violate many of the principles of good education. Rarely has fear been safely used as a constructive force to motivate hygienic habits.

For any productive effect upon the cardiovascular, the arteriosclerotic and the senescent factors of disability and death in the later decades, we must await a volume of new knowledge, as yet but distantly seen on the research horizon.

For a competent attack on the problems of prevention in fields of mental health, we need an almost totally new body of science, as well as a more wholesome philosophy and ethic — something so nearly akin to a widespread practice of Christianity that one wonders at the assurance of the many who offer solutions to these problems. Good personal relations and emotional maturity will hardly be achieved at a level of sweetness and light by any example or method of teaching now in practice in official or voluntary health agencies.

We shoud be unwise to abandon the organization, content and method that have done so sound a job for public health so far in this century. We need to nurse the still young and ill-supported effort of civil government to obtain social benefits from the medical sciences of prevention, while we should abate none of our fervent efforts toward the best possible care of sickness.

We have been told by Bertrand Russell (*Brit. M. J.* **2**:1307-1311, 1949) that:

> Unless men increase in wisdom as much as in knowledge, increase in knowledge will be an increase in sorrow. — Life is scientific if scientific knowledge and teaching based on that knowledge affect daily life, and its economic and political organization.

He further refers to two recently dominant maladies of society, "rage of the Nazis, and listlessness, or toleration and indifference, unreadiness to undertake anything arduous."

Certainly our economic and political futures are unclear, and it is equally obvious that we are prepared and eager to play our part in the arduous search for a peaceful way of life unfettered by a rage of opposition from those who would promote slavery to governmental and police powers.

The health department of local civil government, as we have made it grow and have used it as a symbol of science — free and effective for all people and any nation — offers more on its record of past performance, and promises higher returns for at least the remainder of the twentieth century, than any other instrument of collective social effort.

In essence, the local department of health strives to put to daily use in every home the ageless truths of human biology upon which personal and social survival depend. If one might mention a dilemma that may easily become a world-wide catastrophe in the remainder of this century, and one which man-made laws are powerless to remedy or eliminate, the problem of disproportionate, uncontrolled population growth is of first importance. We can observe the brutal solutions, of infanticide and war; we can succumb to the penalty of general misery — except for the few with the power to survive — or we can use our knowledge of human reproduction to raise the quality of our successors without the present threat of overgrowth in quantity.

Education follows discovery of new facts.

Laws evolve from the informed opinion of the many.

Public-health services are among the strongest resources of our people and our times for recording facts of human existence, for teaching the truths of life and for serving as the agencies of such laws as the people find necessary for their biological survival and for superiority in their way of living.

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

BENJAMIN CASTLEMAN, M.D., *Associate Editor*

VIRGINIA W. TOWNE, *Assistant Editor*

CASE 37081

PRESENTATION OF CASE

A thirty-seven-year-old woman was admitted to the hospital because of lower abdominal and right leg pain.

Approximately three months prior to entry the patient suddenly developed rather severe generalized abdominal pain. She was admitted to another hospital, and was found to have a marked pyuria, for which she was treated with penicillin and streptomycin. On the morning of the third day she awakened with a "pins-and-needles" sensation in the right foot. Shortly afterward she noted pain extending from the right buttock down to the heel. This pain persisted until her admission here. The pyuria cleared, and she was discharged from that hospital after one week. However, the pyuria recurred three days later, and she was treated with daily injections of penicillin at home.

At the time of discharge from the first hospital she began to have rather severe vaginal bleeding, for which she entered still another hospital, two months prior to admission here. Her doctor reported palpating a large, tender pelvic mass. Large blood clots were noted in the vagina, and there was a constant flow of bright-red blood from the cervical os. The cervix appeared free of disease. The urine showed only occasional white cells in the sediment. Examination of the blood disclosed a red-cell count of 2,170,000, a hemoglobin of 36 per cent and a white-cell count of 10,900. A transfusion of whole blood was given, and two days later a uterine curettage was done. An insufficient amount of tissue was obtained for diagnosis by the pathologist. She was given further transfusions, and the blood pressure rose from 98 systolic, 60 diastolic to 120 systolic, 80 diastolic. Ten days later, approximately one and a half months prior to admission here, an exploratory laparotomy was performed. The surgeon reported that he found two extremely large tubo-ovarian abscesses. Both tubes, both ovaries and the appendix were removed. The uterus was not removed. A culture of the abscesses taken at the time of surgery grew *Streptococcus viridans*. The findings of the pathologist were reported as follows: "No evidence of malignancy. Tubes showed marked thickening of villi and wall, diffuse infiltration with lymphocytes and occasional plasma cells. The villi show pronounced infiltration with fat-laden macrophages as well as lymphoid cells. The lumens of the tubes contain degenerating, clotted blood. Ovarian tissue shows cystic structures lined by fibrous tissue and granulation tissue. There are also large masses of infiltrating lymphocytes and neutrophils going along with the infection in the tubes. The appendix shows moderate fibrosis of the wall and is not otherwise remarkable." The postoperative course was considered uneventful aside from the right hip and leg pain. This was aggravated by traction. Roentgenographic studies of the pelvis and lumbar spine were reported as showing no evidence of bone or joint changes. She was discharged home approximately two weeks after the operation. Since the onset of the present illness, there had been a weight loss of between fifteen and twenty pounds.

She had been in the hospital seven years before entry because of massive hematemeses from gastritis that was believed to be due to a large intake of aspirin and she had been in good health following that admission until the onset of the present illness. She was married and had a four-year-old child.

On physical examination the heart and lungs were normal. There was a healing lower-abdominal midline scar. Abdominal palpation showed no tenderness and no definite masses. Pelvic examination showed a normal cervix. In the region of the left vault there was a hard, diffuse, fixed, nontender, ill-defined mass. There was deep tenderness over the right hip and the posterior aspect of the right thigh. There was questionable paresthesia along the lateral border of the right foot. Straight-leg raising was limited because of pain along the course of the sciatic nerve. Ophthalmoscopic examination showed numerous flame-shaped hemorrhages adjacent to terminal arterioles. The veins were markedly dilated, with some tortuosity and marked compression by crossing arterioles. The arterioles were narrowed.

The temperature was 98.6°F., the pulse 95 and the respirations 20. The blood pressure was 125 systolic, 75 diastolic.

Examination of the urine showed a specific gravity of 1.012, a negative test for sugar and a +++ test for albumin; the sediment contained 4 red cells, 10 white cells and occasional granular casts per high-power field. Examination of the blood disclosed a hemoglobin of 6.8 gm., a red-cell count of 2,060,000, and a white-cell count of 10,400,

with 33 per cent neutrophils, 53 per cent lymphocytes, 3 per cent eosinophils, 3 per cent normoblasts, 3 per cent myelocytes, 2 per cent late myelocytes, 1 per cent young neutrophils and 2 per cent questionable plasma cells. There was considerable variation in size of the red cells and some elongated cells. The sodium was 120.9 milliequiv., the potassium 3.8 milliequiv., the chloride 85 milliequiv. and the carbon dioxide 26.8 milliequiv. per liter. The nonprotein nitrogen was 32 mg. per 100 cc. and the total protein exceeded 9 gm., which was the maximum value that could be obtained with the test used. Roentgenographic studies showed multiple small areas of bone destruction in the sacrum, clavicles, humeri, ribs and scapulas. The lungs were clear.

During the hospital course her condition progressively worsened, and the right hip and leg pain continued. A test for Bence–Jones protein in the urine performed on the third hospital day was negative. The serum calcium on the fourth hospital day was 10 mg. per 100 cc. On the seventh hospital day her nose began to bleed; it bled intermittently for two days. On the next day the nonprotein nitrogen was 54 mg., the total protein 14.85 gm., the albumin 1.46 gm. and the globulin 13.39 gm. per 100 cc. There was disorientation, slurred speech and partial aphasia on the tenth hospital day. The total protein that day was 15.53 gm., the albumin 1.33 gm., the globulin 14.20 gm. and the nonprotein nitrogen 58 mg. per 100 cc. The sodium, chloride and calcium showed little change from the previous values. The serum phosphorus was 4.6 mg. and the phosphatase 1.8 units per 100 cc. She remained confused and complained of pain only when specifically questioned. The nonprotein nitrogen on the thirteenth hospital day was 74 mg. per 100 cc. The urine showed a specific gravity of 1.018 and gave a +++ test for albumin, and the sediment contained rare red and white cells and occasional granular casts. On the fourteenth hospital day a twenty-four-hour urine specimen was reported as showing 1.31 gm. of total protein, with 0.65 gm. Bence–Jones protein. The bleeding time was 4 minutes and the clotting time 5 minutes. The corrected sedimentation rate was 1.1 mm. per minute. The following day she was started on ACTH (adrenocorticotrophic hormone). The eosinophil count on the seventeenth hospital day was 6 per cubic millimeter. The nonprotein nitrogen on the same day was 42 mg. per 100 cc.; the sodium was 128.5 milliequiv. and the potassium 3.1 milliequiv. per liter. The mental state and general condition showed no improvement. A test for cryoglobulins in the serum done on the twentieth hospital day was negative. Two days later the total protein was 15.18 gm., the albumin 0.97 gm., the globulin 14.21 gm. and the nonprotein nitrogen 56 mg. per 100 cc. On the twenty-third hospital day a 5 by 5 cm. mass was noted on the left posterior chest wall, affixed to the ribs. The nonprotein nitrogen was 64 mg. per 100 cc. on the twenty-seventh hospital day. She remained extremely ill, having irrational intervals. The pelvic mass increased in size during these weeks. She continued to receive daily injections of ACTH. On the thirty-fourth hospital day the nonprotein nitrogen was 30 mg., the total protein 12.80 gm., the albumin 1.25 gm. and the globulin 11.55 gm. per 100 cc. The urine remained essentially unchanged. The blood hemoglobin was 5.3 gm. and the white-cell count 4950. On the forty-fifth hospital day the rectal temperature was 101°F. Moist rales were heard over both lung bases. The nonprotein nitrogen was 42 mg. per 100 cc. She died quietly on the next day.

Differential Diagnosis

Dr. Bernard M. Jacobson*: This is certainly a patient with severe myelomatous disease, regardless of what we finally decide was present in the pelvis.

Was any decrease in platelets noted in the record?

Dr. Benjamin Castleman: No.

Dr. Jacobson: Would you show us the x-ray films, Dr. Wyman?

Dr. Stanley M. Wyman: As the protocol states, there are a large number of small, rather sharply defined rarefactions in most of the visualized bones, including the pelvis, femora, skull, lumbar spine, shoulder girdle and ribs. The heart and lung fields are not grossly remarkable on the original examination. There is some questionable fullness overlying the left hilus in the last examination, one month after the initial one. I am unable to make a more definite statement about this.

Dr. Jacobson: Do you see the 5 by 5 cm. mass that was felt, Dr. Wyman?

Dr. Wyman: There is some soft-tissue thickening of the left posterior chest wall, best seen in the lateral view. However, there may be enlarged nodes at the left hilus as well.

Dr. Jacobson: I think I can save time by restating a few facts in this case and drawing a direct deduction from them. There were several symptoms, physical signs and laboratory data that were highly suggestive of diffuse bone-marrow disease. The patient had pain, apparently originating mainly from the lumbar spine, severe anemia and x-ray evidence of osteolytic lesions scattered throughout the skeleton. Also, two questionable plasma cells were noted in the blood smear. Much more diagnostic, of course, than these bits of suggestive evidence were two items. The inordinately high globulin was almost pathognomonic of multiple myeloma. I can dismiss without further ado such conditions as kala-azar, and so forth, that might show a globulin somewhere in this range. The other pathognomonic sign was the Bence–Jones protein, found in a well tested urine specimen. I am sure that

*Assistant physician, Massachusetts General Hospital.

during her life one or more bone-marrow punctures were performed, and I am virtually certain that these showed a typical picture of plasma-cell myeloma.

I should like to mention briefly an unusual situation in this case. We are told that the globulin was as high as 14.3 gm. That is very high. I think the highest globulin in the literature in a case of multiple myeloma is 15.5 gm. I have seen a few at 13 gm. I have never seen one quite this high before. The term cryoglobulin deserves some mention. It has been known, at least since Wintrobe and Buell[1] described a case in 1933, that there may appear in the serum or plasma of some patients with myeloma a cloudy white or yellow precipitate shortly after the blood is removed from the body. The precipitate is more marked when the blood is chilled in the refrigerator, with partial resolution or solution of the material when the blood is again warmed up to room or body temperature. I have seen two such cases, and there were several other cases in the literature prior to the report of Lerner and Watson[2] in 1947 of two similar cases, one of which was that of a patient with established multiple myeloma. They used the term cryoglobulin for the first time to denote the globulin that precipitates out in the cold and redissolves when brought to body temperature. Since that time several studies have been made of the presence or absence of cryoglobulin in a variety of diseases. Some ten to thirty per cent of all patients with severe disease — including various inflammatory conditions, like rheumatoid arthritis or tuberculosis, and neoplastic conditions like carcinomatosis, lymphoma, leukemia and so forth — will show smaller or larger amounts of so-called cryoglobulin. The larger amounts are visible to the naked eye; the smaller amounts are not, and range from 10 to 30 mg. per 100 cc. The cryoglobulin is determined by estimating the protein in the plasma or serum before and after being put in the refrigerator. The macroscopic amounts of cryoglobulin run in a quantitative examination from 3 to 8 gm. per 100 cc. There are some dramatic instances in which one places what looks like a perfectly clear serum in the icebox and then goes back an hour later and finds a cloudy material. If one lets it stand, it may separate into one or more layers.

Chemically speaking, the cryoglobulin cannot be distinguished from other normal or abnormal amounts of normal serum globulin. By the old Howe fractionation technic, this falls into the euglobulin or the pseudoglobulin fraction. By the newer electrophoretic analysis, the few cases that have been studied thoroughly appear to be in the gamma globulin fraction. However, there are some cases, I have been told, that fall between the beta and gamma fractions, somewhere around the fibrinogen fraction. The significance of cryoglobulin from the point of view of pathogenesis of various symptoms and signs is still rather obscure. In Wintrobe's original case in 1933, the patient presented the usual phenomena of venous thrombosis in the retina with Raynaud-like symptoms in the limbs. Barr[3] has recently reported a case with a similar connection. There are a few other cases in the literature with occlusive vascular phenomena in the venules or veins as the result of chilling of the circulatory medium that contains this globulin.

In the case under discussion the retinal veins were dilated, which suggests a venous thrombosis. I am told about nosebleeds but no Raynaud-like symptoms. I might guess this patient had agglutination of red cells in the abnormal serum globulin, with stasis and capillary reaction as a cause of hemorrhage. The patient had passed tarry stools. On the other hand, in any bone-marrow-infiltrative disease, thrombopenia is common, due to megakaryocytic suppression. I am told nothing about this patient's platelets. Certainly the commonest cause of purpura or abnormal bleeding in a patient with myeloma is thrombopenia. It is possible, had this patient lived longer, that she might have had Raynaud's symptoms because of the abnormal amount of globulin.

I cannot relate the multiple myeloma in any way to the episode three months ago of bilateral pelvic inflammatory disease or to the pathological findings that were noted at operation. I come, then, to the mass that was seen at the time of entry, which was increasing in size. I imagine that the surgeon had a good look at the pelvis, and there is no statement that any mass was left after she was operated on. Something had come up in the interim. The mass was probably not inflammatory, because all the organs that might have been inflamed were taken out. Nothing was felt by pelvic examination other than the mass in the left side. Could this mass be related to the primary disease, multiple myeloma? It could be. Once in a while an extramedullary retroperitoneal myeloma is associated with multiple myeloma. Only rarely does it actually infiltrate the spleen, liver, or kidney enough to increase these organs in size to that extent.

The other condition that I should keep in mind — we see it occasionally in myeloma — is amyloid disease. Amyloid disease is usually something the pathologist tells us about; we rarely make the diagnosis during life. The incidence of amyloid disease in myeloma, the so-called para-amyloid or atypical amyloid, is quite high. It usually involves the nonstriated muscles but may involve lymph nodes or other such structures. It may have been an amyloid mass arising from retroperitoneal lymph nodes. In a patient who has thrombopenic purpura, one wonders about a retroperitoneal hematoma. That might give all the physical signs noted.

There is still another possibility that might be mentioned. In the patient with diffuse bone-marrow

infiltration by tumor, the spleen is often palpable because of extramedullary hematopoiesis as a compensating phenomenon. It is usually not felt in multiple myeloma, but is seen commonly in metastatic carcinoma of bone marrow. We have a patient in our anemia clinic, with chronic rheumatic heart disease, in whom a pelvic mass was found. She was operated on by the Gynecological Service for ovarian cysts, and was found to have a large ptotic spleen lying in the pelvis. She still has her spleen. She has a peculiar anemia, to which we could give no specific name. If this patient had a large spleen in the pelvis to account for the mass, I would expect the mass to be easily movable and not so hard. The mass that rose from the left posterior thoracic cage was probably extraosseous myeloma sneaking out of the bone marrow. That is much more likely than an amyloid mass. The diagnoses I should like to make are multiple myeloma and possibly myeloma kidney — she certainly had renal insufficiency. In addition she had a lesion in the pelvis, of an undetermined type.

DR. CASTLEMAN: Does anyone want to determine it?

DR. F. DENNETTE ADAMS: Does Dr. Jacobson think the vaginal bleeding was a manifestation of the myeloma, or due to the disease for which the ovaries were removed?

DR. JACOBSON: Perhaps Dr. Hertig would answer that.

DR. ARTHUR T. HERTIG: I think the most likely possibility here is that she had two diseases: a pelvic inflammatory disease and multiple myeloma. Bleeding is more likely with the pelvic inflammatory disease, although I should think, as Dr. Jacobson very ably demonstrated, that she could have bled from any of the orifices on the basis of a thrombopenic purpura. I think she bled as a result of the pelvic inflammatory disease.

DR. JOSEPH C. AUB: I did not think multiple myeloma was so rare in extramedullary tissues. I have seen it several times myself.

DR. JACOBSON: Plasma-cell infiltration of the liver, spleen, heart and kidneys is usually not sufficient to make the organs palpable clinically.

DR. AUB: The first thing I examine in a male with this disease is the testis. It often enlarges the testes.

DR. CASTLEMAN: You think the pelvic mass could be due to myeloma?

DR. AUB: I would put it first, but I would not be disturbed if it were either.

DR. ADAMS: It could be hematoma, on that basis.

DR. HERTIG: It just occurs to me that perhaps the plasma cells seen in the original specimen from the pelvis were tumor cells — that it was not a true pelvic inflammatory disease.

CLINICAL DIAGNOSES

Multiple myeloma.
Pyelonephritis.

DR. JACOBSON'S DIAGNOSES

Multiple myeloma.
?Myeloma kidney.
Lesion in the pelvis, type undetermined.

ANATOMICAL DIAGNOSES

Plasma-cell myeloma, with extensive extraosseous involvement.
Myeloma kidney.
Extramedullary hematopoiesis of spleen and liver.
Pulmonary edema, severe.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: At autopsy numerous tumor nodules of all sizes — 0.5 up to 3 cm. — were scattered over the peritoneum, on the surface of the intestines and along the scar of the old operation. These were grayish white and obviously neoplastic. In the pelvis there was a huge lesion that was made up of a confluence of these tumor nodules, producing interadherence of the bladder, rectum, sigmoid and uterus, so that it was very hard to know what we were handling. We had to pick up the entire pelvic mass in block. In so doing and in dissecting it out, we found that the tumor had involved all the organs, including the uterus, which weighed about 150 gm. and was completely infiltrated with tumor. Microscopical examination of the tumor on the serosa of the bowel and peritoneum and in the pelvis was the same as that found in the bone marrow — plasma-cell myeloma. This is therefore an example of the type of myeloma that involves extraosseous tissues. It involved the spleen, not in nodular fashion, as is commonly seen, but diffusely. In addition to the plasma cells in the spleen there was hematopoiesis, both of which probably accounted for the enlargement of the spleen, which weighed 400 gm.

There was a tumor nodule in the liver and an unusual finding of a good-sized tumor nodule in the interauricular septum of the heart. The lymph nodes along the abdominal aorta were all involved as well. The lungs were very heavy — full of fluid, which stained much more intensely than is usually seen; perhaps it was due to the increased protein in the fluid. That was true also in the liver, where there was a great deal of edema and the fluid seemed to be quite deeply stained.

DR. JACOBSON: Could you gather that the protein was being secreted or synthesized by the plasma cells, with some beginning vacuolization of the plasma cells?

DR. CASTLEMAN: No, we could not gather that at all. The plasma cells were all large plasma cells, many with two or three nuclei and an occasional mitosis — perhaps the type that Jaffe[4] calls the intermediate type, between the very well differentiated plasma cells and the undifferentiated cell, which he thinks may be close to the reticulum

cell. We did not see any plasma cells in the lungs, where there was a large amount of fluid.

DR. ADAMS: Did the kidneys show the usual picture?

DR. CASTLEMAN: The kidneys showed what one expects to find in the so-called myeloma kidney: casts in the tubules. In addition, there was a moderate degree of pyelonephritis, which I believe was due to pressure of the tumor mass on the ureters. There was no myelomatous infiltration of the kidneys.

DR. AUB: The normal blood calcium interests me. We always think of the blood calcium as being carried by protein. Here was a tremendous protein and a normal blood calcium. In multiple myeloma the calcium ranges from 10 to 14 mg. per 100 cc. without any relation to the protein. I wish I understood that.

DR. CASTLEMAN: About half the cases of myeloma have an elevated calcium.

DR. AUB: It does not seem to bear any relation to the protein. This woman had a very high globulin and a normal calcium.

A PHYSICIAN: Why did she have such a low blood sodium?

DR. CASTLEMAN: I do not know. There was no tumor infiltration of the adrenal glands.

I agree with Dr. Hertig that the inflammatory reaction in the tubes said to have been composed of lymphocytes and plasma cells was most likely myelomatous infiltration.

REFERENCES

1. Wintrobe, M. M., and Buell, M. V. Hyperproteinemia associated with multiple myeloma. *Bull. Johns Hopkins Hosp.* **52**:156-165, 1933.
2. Lerner, A. B., and Watson, C. J. Studies of cryoglobulins. I. Unusual purpura associated with presence of high concentration of cryoglobulin (cold precipitable serum globulin). *Am. J. Med. Sc.* **214**:410-415, 1947.
3. Barr, D. P., Reader, G. G., and Wheeler, C. H. Cryoglobulinemia. I. Report of two cases with discussion of clinical manifestations, incidence and significance. *Ann. Int. Med.* **32**:6-29, 1950.
4. Lichtenstein, L., and Jaffe, H. L. Multiple myeloma: survey based on thirty-five cases, eighteen of which came to autopsy. *Arch. Path.* **44**:207-246, 1947.

CASE 37082

PRESENTATION OF CASE

A thirty-eight-year-old woman entered the hospital because of repeated episodes of lower-abdominal pain and diarrhea.

About four and a half years prior to admission the patient suffered repeated episodes of sneezing that were diagnosed by a local allergist as "rose fever." She was found to be slightly sensitive to wheat, and was told to avoid wheat products in her diet. About two and a half months later, she experienced for the first time severe lower-abdominal cramps some twelve hours after eating cake. The pain was more severe on the right side of the abdomen, lasted for three or four days, and was only relieved by hypodermic injections. It was quite similar to but not identical with menstrual pain, being located somewhat higher in the abdomen. There was no associated change of bowel habits, and no nausea or vomiting. Barium-enema examination, gastrointestinal series and gall-bladder series done shortly thereafter revealed no abnormality. It was thought by her physician that all her symptoms were due to wheat sensitivity. She was placed on a strict wheat-free diet, but abdominal cramps persisted, necessitating hospitalization at one time or another. She had lost 20 pounds in weight. About eighteen months before entry, the lower-abdominal pain became more severe and frequent, and lasted longer. For the first time the abdominal cramps were accompanied by 3 to 4 loose, watery stools daily. The stools contained grossly no blood or mucus. She was given ACTH (adrenocorticotrophic hormone) over a period of thirty-six hours, with complete relief of symptoms. For three weeks she was able "to eat everything" and gained 17 pounds. The symptoms recurred; Cortisone and pavatrine with phenobarbital were tried, with very little benefit. About one month before entry, her diarrhea became more frequent: 4 to 6 stools daily, with exacerbation of abdominal cramps. She had to use Demerol for relief of pain. The night before entry she was seized by excruciating pain, which was not relieved by medications. She retched a great deal, with pain, but did not vomit. She denied any associated chills, fever or cough. The stools had contained no blood or mucus.

She had had an appendectomy ten years before entry. A hysterectomy and right oophorectomy had been performed because of progressively increasing dysmenorrhea, manifested by crampy right-lower-abdominal pain. Otherwise the past history was noncontributory.

On physical examination the lungs were clear; the heart was not remarkable. During the examination she was seized by lower-abdominal cramps that forced her to cry out. The pain was relieved by Demerol. The examination of the abdomen during the painful episode revealed diffuse tenderness especially marked over the right lower quadrant. The abdominal wall was held in voluntary spasm. There was no rebound tenderness. Normally pitched peristaltic gurglings were markedly increased over the entire abdomen. Palpation of the abdomen was unsatisfactory. No organs or abnormal masses were made out.

The temperature was 98°F., the pulse 88 and the respirations 16. The blood pressure was 110 systolic, 70 diastolic.

The white-cell count on admission was 14,200; one day later it was 8100, with a normal differential. The hemoglobin was 12.4 gm. The urinalysis was normal. The stools showed no parasites. While in the hospital, she had repeated episodes of severe abdominal pain, which was relieved only by Pantopon, Demerol and sometimes sterile saline

injections. When she was free from pain it was found that the abdomen was soft and relaxed, with only slight tenderness in the right lower quadrant. Pelvic examination confirmed fullness and tenderness in the right lower quadrant. Proctoscopy up to 8 inches showed normal colonic mucosa.

Plain films of the abdomen revealed several loops of gas-filled and slightly dilated small bowel, including the terminal ileum. There was some gas and fecal matter in the large bowel. Gastrointestinal series showed a normal esophagus and stomach. The progression of the barium meal throughout the small bowel was followed by means of hourly films. At the end of four hours the stomach was almost completely empty. The barium, however, had only passed as far as the midileum, at which point a markedly dilated loop of small bowel was encountered. This was located in the lower midpelvis. Within this dilated segment hyperperistalsis was encountered; the loop of bowel was relatively fixed. A definite obstruction could not be demonstrated in the lumen of the small intestine (Fig. 1). At the end of seven hours, the dilated loop of ileum was still present. Some of the barium had passed through this loop into the ascending colon.

FIGURE 1.

On the night of the seventh hospital day, the patient had two severe attacks of pain, which occurred when she was in sound sleep. The first episode was accompanied by nausea and vomiting, and lasted for one and a half hours. On the twelfth hospital day one observer felt a tender elongated mass in the right lower quadrant. On the sixteenth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. JOHN W. RAKER*: As one reads through this, the combination of allergy with abdominal pain makes one think of some systemic disease that might possibly explain the whole picture. The first one that came to my mind was Osler's disease, but I think it can be discarded because there is no history of purpura, angioneurotic edema or anything of that sort. She was probably somewhat beyond the age group in which we usually observe Osler's disease. For these reasons I think it is unlikely.

I do not know anything about wheat sensitivity as far as intestinal allergy is concerned, but I think it is very unlikely.

The fact that this patient was given hypodermic injections of sterile saline that presumably helped at one time or another would make one wonder whether she had a psychoneurotic personality and whether the episodes were manifestations of hysteria. However, I think that is quite unlikely because she had two positive findings: first, she was awakened from sound sleep by abdominal pain and secondly, the x-ray findings suggest an organic lesion. On the basis of these facts alone I can rule out psychoneurosis.

If this was organic disease but not a general systemic disease, I have to find the location of it. The stomach and esophagus seem to have been ruled out by two negative gastrointestinal examinations, one made during the recent admission. The gall bladder has been quite well excluded by the normal cholecystogram in the past. Unless Dr. Wyman can find a laminated gallstone in the right lower quadrant to suggest a gallstone ileus, I am going to throw that out. The kidneys showed no evidence of disease; the urine was normal. There was no evidence to make one suspect any other retroperitoneal organ. The appendix had been removed, excluding one of the commonest causes of right-lower-quadrant pain. That leaves me with the large and small bowel.

I am told that a barium-enema examination made sometime within the four years before operation was negative. No barium-enema examination was made on this admission. That would have been a helpful examination. It might well have excluded disease of the cecum and it might have determined whether or not there was a pathologic condition in the small bowel. Proctoscopy was negative to 8 inches, excluding fairly well but not

*Assistant in surgery, Massachusetts General Hospital.

entirely the diagnosis of ulcerative colitis. I do not believe stool guaiac tests would have helped to eliminate the large bowel, but no gross blood was passed in the stool. I believe we can eliminate the large bowel and find another more likely location for the disease.

This pain, as described, sounds like the pain of smooth-muscle contraction, probably from intermittent small-bowel obstruction with spontaneous relief. If this was a small-bowel lesion, was it extrinsic to the bowel or intrinsic? If extrinsic, there could have been a cancer elsewhere, with implantations on the small-bowel. However, there was no evidence of a primary tumor elsewhere, unless it was in the uterus ten years previously. The process had been going on for four and a half years with only slight progression, and on that basis I can probably exclude malignant disease. I cannot exclude some other process associated with the previous pelvic disease. I do not know whether or not the previous operation relieved her abdominal pain, but I assume it did because it was stated that the pain that led to admission was a new pain. It occurred perhaps five years after the first episode, which resulted in a hysterectomy. She was still in the age group in which the ovaries are functioning, and I suppose she could have had endometriosis with implantations on the small bowel, or the small bowel could have been bound down into the pelvis by endometriosis. However, there was no positive evidence for that. The physical examination does not help me because there was no description of nodularity in the pelvis. I think that can be excluded fairly well.

I come to a diagnosis which I do not believe I can exclude: fibrous adhesions in the lower abdomen, associated with the previous operation. These adhesions could have trapped some small bowel and caused intermittent obstruction. The pelvic examination might indicate residual adhesions and the right-lower-quadrant mass might indicate a trapped incarcerated small-bowel loop. The white-cell count was elevated, but one might suspect that this leukocytosis was caused by dehydration, because there was a normal differential and the count fell rapidly to normal the following day. However, there are some things that do not fit the development of small-bowel obstruction from adhesions. The dilated loop that was said to be fixed in the pelvis showed hyperperistalsis. This would mean that the loop that lay next to the previous operative site was not itself the site of obstruction. The obstruction was somewhat distal to the fixed point. Secondly, the story suggests recurrent complete obstruction with spontaneous relief rather than a subacute process. I get the impression from reading the history that she was quite well between episodes; that does not fit with the chronic type of small-bowel obstruction that we occasionally see. Apparently the surgeons did not suspect a strangulating obstruction, because four days were allowed to elapse between the time the mass was felt and the date of the operation. I presume the four days were used in deflating the small bowel with a Miller–Abbott tube.

I think I had better see the x-ray findings before I get myself in any deeper.

Dr. Stanley M. Wyman: Two plain films of the abdomen were taken several days apart. The first film shows a moderate quantity of gas in several loops of what definitely appears to be small bowel; these appear to be somewhat distended but not grossly dilated. There is some gas in the right colon. The second film shows less gas in the loop of small bowel, but again one C-shaped loop is seen in the right lower abdomen. This quite possibly could represent ileum. No stones are recognizable.

Dr. Raker: Can you see the loop that was said to show hyperperistalsis?

Dr. Wyman: That was demonstrated in the gastrointestinal series.

Dr. Raker: Do you agree that the stomach is negative?

Dr. Wyman: Yes; the stomach, duodenum and duodenal loop all appear normal on the films, and the serial films of the small bowel show normal-appearing loops of jejunum and upper ileum. The films of the small bowel taken approximately three or four hours later show huge dilatation of a loop of ileum. On this last film there is a very unusual-appearing loop of ileum that is widely dilated but contains only streaks of barium lying in folds (Fig. 1). There is, in addition, a very peculiar longitudinal streaking, with this area running counter to the haustral markings of the bowel.

Dr. Raker: This is not the type of picture seen in regional ileitis?

Dr. Wyman: No; the mucosal pattern in this portion of bowel is entirely normal.

Dr. Raker: Can you see any definite obstruction at any point?

Dr. Wyman: This is a grossly abnormal loop of bowel extending over a distance of 8 to 10 cm. It is seen on two films, and it moves somewhat in position. The unusual part of it is that although the bowel is dilated there is only a very small trace of barium in it.

Dr. Raker: Would this lead you to suspect an intussusception?

Dr. Wyman: I think this picture is quite characteristic of intussusception.

Dr. Raker: I am given a suggested diagnosis of small-bowel obstruction. I was going to ask Dr. Wyman if he can be sure the terminal ileum is gas filled. I gather he is quite sure that the terminal ileum is normal.

Dr. Wyman: I think that is true. It is a little hard to be sure of the bowel crossing from this point to the cecum.

DR. RAKER: I was going to make a plea that it would have been nice to have a barium-enema examination, but apparently the terminal ileum was fairly normal, or at least the diseased area lay above the terminal ileum.

In discussing intrinsic lesions of the small bowel, the first one I think of, of course, is regional enteritis. She had diarrhea, abdominal pain, weight loss and a chronic disease. All suggest regional enteritis. That she was given ACTH does not necessarily imply that an inflammatory lesion was present, particularly since the response was very short-lived and since Cortisone given later failed to relieve her. I am somewhat at a loss as to why the drug was given. I trust we shall not see a large number of patients of this kind treated with ACTH as a diagnostic test. The case for regional enteritis would be strengthened if there were any narrowing of the terminal ileum shown in the x-ray films, especially if it had been going on for four and a half years. Since that is not seen, I am going to throw that diagnosis out.

That leaves a localized intrinsic small-bowel obstruction as the best explanation for the picture. I think it is not surprising that Dr. Wyman could not see a definite small localizing area of obstruction, as such an area might not have been filled just at the time the x-ray films were taken. The intermittent character of the pain and the episodes of illness followed by complete relief suggest there may have been recurrent episodes of intussusception. The fixed loop may or may not have been partially inflamed because it had been part of an intussusception before. The combination of a localized obstructing lesion and recurrent episodes of intussusception — if I have interpreted this correctly — would probably be best explained by a slowly growing primary tumor of the small bowel. I assume from the chronic nature of the story that this was a benign lesion, and if I had to bet on the type of the lesion I would bet on a submucous lipoma of the small bowel. I shall leave that as my best diagnosis.

DR. PERRY CULVER: I think it is fair to say that we arrived at approximately the same point of view as Dr. Raker. Before the x-ray films were taken I thought there was organic disease, most likely regional ileitis. The mass that we felt in the right lower quadrant seemed consistent with inflamed loops of terminal ileum. There was some suggestion of gas-filled loops as well. The right lower quadrant gave a somewhat doughy impression. I chose the diagnosis of partial obstruction and regional ileitis. I thought the elevated white-cell count could be explained on the basis of small-bowel obstruction rather than by dehydration. We do see a rise in white-cell count in intestinal obstruction without any inflammatory disease. If the bowel distention subsides the white-cell count goes down.

DR. DANIEL ELLIS: This history is similar to that of a patient whom we had here two years ago. She was treated by a psychiatrist rather than an allergist for two years. She entered this hospital for studies because of recurrent episodes of abdominal pain. We never saw her in an acute attack. The Radiology Department was very helpful; they demonstrated what appeared to be a diverticulum of the small bowel. That patient was operated on; she did have a small-bowel diverticulum that looked like a Meckel's diverticulum. It was within 10 inches of the cecum. The patient has been completely well ever since. I wonder if Dr. Raker would consider Meckel's diverticulum as a possibility, and as the cause of this patient's intussusception.

DR. RAKER: I meant to mention Meckel's diverticulum as a cause of acute small-bowel obstruction, with the bowel kinked by the bands that bind down the diverticulum, but I would have excluded it along with obstruction due to adhesive bands.

DR. JOHN T. STANBURY: Are carcinoids fairly common in this area?

DR. BENJAMIN CASTLEMAN: Carcinoids as a rule do not produce intussusception.

DR. RAKER: I have never seen intussusception from a Meckel's diverticulum, but I suppose a diverticulum could invert and cause it.

DR. J. H. MEANS: I should like to ask about the mechanism of intussusception. The lesion that is producing it is presumably present all the time, and in some way or other it causes the bowel to undergo intussusception that reduces itself, does it? I wonder why it reduces with the causative lesion still present.

DR. CASTLEMAN: They are usually polypoid lesions. The intussusception is quite easy to reduce. Peristalsis itself can move it back and forth.

DR. MEANS: It sets up counterperistalsis and undoes itself, then does it over again?

DR. CASTLEMAN: Yes.

CLINICAL DIAGNOSES

Small-bowel obstruction.
Regional ileitis.

DR. RAKER'S DIAGNOSIS

Submucous lipoma of small bowel, with intussusception.

ANATOMICAL DIAGNOSIS

Meckel's diverticulum, with intussusception.

PATHOLOGICAL DISCUSSION

DR. FRANK C. WHEELOCK, JR.: The operation performed by Dr. Leland S. McKittrick was very interesting. We passed a Miller–Abbott tube — not because there was obstruction at the time, but to deflate the small bowel so that it could be more

easily examined without too much handling. We found a large mass in the right lower quadrant, which was obviously an intussusception. The intussuscepting portion had gone down into the terminal ileum perhaps 2 feet. We reduced it very easily. It would be easy to see how it could have been done by the patient herself because it slid back like a telescope. We found a mass with a dimple on the antimesenteric side into which some mesentery seemed to lead. Instead of thinking it was tumor, as we certainly would have thought from feeling it, because of the mesentery we suspected a Meckel's diverticulum turned outside in and acting as the intussuscepting point. A localized bowel resection was carried out as the easiest way to get rid of the Meckel's diverticulum, which we could not push out into its normal position. On opening the specimen we found that it was a Meckel's diverticulum, but even then we were unable to push it out. Dr. McKittrick could not recall having seen a Meckel's diverticulum do this before, and it was not one of our preoperative diagnoses. The preoperative diagnosis was a small-bowel obstruction, with a question of regional enteritis.

Dr. Castleman: The inverted diverticulum that was inside the bowel had acted as a polyp and produced the intussusception down the bowel. There were some small ulcerations on the tip of this, but we were unable to find any gastric epithelium, which occasionally occurs in a Meckel's diverticulum.

Dr. Wheelock: It is too bad this was not found at the time of a hysterectomy. It would have saved the patient a good deal of misery.

Dr. Ellis: How far was the Meckel's diverticulum from the ileocecal valve?

Dr. Wheelock: I thought it was about 2½ feet from the ileocecal valve.

Dr. Walter S. Burrage: A few other points may add interest to the earlier clinical history. This patient moved East a year ago from a western city. She brought a letter from her referring physician stating that she had been found so sensitive to wheat that on three or four occasions in recent years she had required hospitalization for intense abdominal cramps at times when her wheat avoidance had been broken. Her allergist felt that this sensitivity had spread to include other articles of diet, and complete avoidance of allergenic foods had become progressively difficult. The patient added that on one occasion the eating of a chocolate bar containing a small amount of wheat had thrown her into an intense spasm of abdominal pain and diarrhea.

Supervision of this patient in the past year had made food sensitivity seem increasingly unlikely as a cause of her trouble, as she had been periodically symptom-free on a routine low-residue diet, excluding only wheat, which she had been fearful of eating. It has likewise been repeatedly observed that her pain and her more recent tenderness and spasm had always been confined to the right lower quadrant. Frequent examinations of the abdomen revealed no tenderness, masses or spasm during the period in which the patient complained only of mild intermittent diarrhea and occasional right-lower-quadrant cramps. A barium-enema examination seven months before admission showed no definite pathologic condition. This was not repeated during the hospitalization, as it was thought unwise to give cleansing catharsis during the acute symptoms because of the diagnosis of probable partial intestinal obstruction at that time.

I should like to state for the record that ACTH and Cortisone were given to this patient prior to her arrival in New England.

You will also be interested to know that she has been able to eat wheat without restriction and without symptoms since the operation.

NEW HAMPSHIRE MEDICAL SOCIETY

PROCEEDINGS OF THE ONE HUNDRED AND FIFTY-NINTH ANNUAL MEETING

Scientific Sessions, September 11 and 12, 1950

THIS annual meeting was unique—at least in New England—as it was held jointly with the Vermont State Medical Society and the New Hampshire Surgical Club. Better attendance, more enthusiastic speakers, larger exhibits and furtherance of friendly relations with the physicians of our sister state were direct results.

The general session was opened at the Mount Washington Hotel, Bretton Woods, New Hampshire, at 9:20 a.m., with Dr. Francis M. Appleton, of Gorham, presiding and welcoming the societies to his county. Dr. John P. Bowler, President of the New Hampshire Medical Society, and Dr. Hiram E. Upton, President of the Vermont State Medical Society, responded cordially. Scientific films and eleven sectional meetings of men interested in the various specialties occupied the remainder of the morning.

After the introduction of the delegates from the other New England State Medical Societies at the afternoon session, Dr. William Cone discussed "The Protection of Patients." He was followed by Dr. Robert R. Linton, who described "The Surgical Treatment of Chronic Ulceration of the Lower Extremities." A paper on "The Rights and the Obligations of the Medical Witness" was given by Judge Amos N. Blandin, and "The Present Status of the Treatment of Arthritis" was described by Dr. Marian E. Ropes.

Governor Sherman Adams of New Hampshire spoke at the banquet. Dr. Paul R. Hawley gave the main address, a survey of voluntary health-insurance plans.

The gold medal for fifty-year membership in the Society was presented to Dr. Benjamin F. Hodsdon by President Bowler. Several awards were made by the Vermont Society.

On September 12, a paper on "The Position of the Dental Profession in the Question of Socialization of Dental Care" was read by Dr. Philip C. Martin. He was followed by Dr. Howard Rusk, who spoke on "Physical Medicine and Rehabilitation." "The Chronic Cough" was discussed by Dr. Donald S. King, and a "Critical Analysis of Hospital Rate Structures" was made by Mr. William L. Wilson. Dr. Allen O. Whipple concluded the scientific program with a paper on "Radical Surgery in the Treatment of Cancer."

At the general meeting of the Society the list of newly elected officers was read and the proposed amendment to the Constitution, providing for a president-elect, was presented. The Secretary reported briefly on the various actions taken by the House of Delegates. He estimated the attendance of physicians at the meeting at about 340, with 239 members present from New Hampshire.

The report of the Trustees was given as follows by their president, Dr. George C. Wilkins, and was accepted by the Society.

In February of this year the Board of Trustees lost by death its oldest member and secretary, Dr. Howard N. Kingsford. He was a past president of the Society, and because of his medical-school and college activities, his work as pathologist and his genial personality, there was no one in the medical profession better known, more respected, or better loved. Howard Kingsford will be missed by all of us.

The fiscal year begins January 1, and this year's Trustees' Report is somewhat outdated because of the lateness of the 1950 meeting. As of January 1, 1950, the General Fund was $5072.72, the Bartlett Fund $4454.29, the Pray Fund $1328.35, the Burnham Fund $2069.43, and the Benevolence Fund $7260.53.

By vote of the House of Delegates, taken early in 1950, $1000 was added to the latter fund. It is hoped that substantial additions can be made to this fund in the next few years, so that we may further its purpose by using the income to aid any indigent physician in this state.

The members of the Society should realize that last year, by a vote of the House of Delegates, $3000 was taken from the surplus in the General Fund and used to defray the running expenses of the Society. Otherwise there would have been a deficit of $1777.14 in the operating expenses of the Society.

The Trustees approved the audit of the income and expenditure report of the Secretary-Treasurer submitted by a public accountant. All payments were shown by canceled checks and invoices, and all receipts properly checked.

The Trustees regret that no prizes were awarded this year. None of the essays submitted were considered to have fulfilled the intent or requirements of the donors of the prizes, or the conditions hitherto established by the Trustees. Prizes will be offered next year and the usual notices will be mailed to each member of the Society.

GEORGE C. WILKINS, M.D., *President*
JAMES W. JAMESON, M.D., *Secretary*

The retiring President presented Dr. Harris E. Powers, President for 1950–51, who spoke briefly and then closed the annual meeting.

The New England Journal of Medicine

Formerly
The Boston Medical and Surgical Journal
Established 1828

Official Organ of
THE MASSACHUSETTS MEDICAL SOCIETY
and
THE NEW HAMPSHIRE MEDICAL SOCIETY
OWNED BY THE MASSACHUSETTS MEDICAL SOCIETY AND PUBLISHED WEEKLY UNDER THE JURISDICTION OF THE COMMITTEE ON PUBLICATIONS

Richard M. Smith, M.D., *Chairman*
James P. O'Hare, M.D. Conrad Wesselhoeft, M.D.
Oliver Cope, M.D. John Fallon, M.D.

Joseph Garland, M.D., Editor

Associate Editors
Thomas H. Lanman, M.D. Donald Munro, M.D.
Theodore H. Ingalls, M.D.

Clara D. Davies, Executive Editor
Robert O'Leary, Assistant Editor

Editorial Board
C. Guy Lane, M.D. Maxwell Finland, M.D.
Henry R. Viets, M.D. C. Stuart Welch, M.D.
Robert M. Green, M.D. Vernon P. Williams, M.D.
Dwight O'Hara, M.D. Benjamin Castleman, M.D.
Fletcher H. Colby, M.D. Hugh R. Leavell, M.D.
Robert L. Goodale, M.D. J. Englebert Dunphy, M.D.
Chester M. Jones, M.D. Robert W. Buck, M.D.
Harvey R. Morrison, M.D. Herrman L. Blumgart, M.D.
Deering G. Smith, M.D.*

*Representing the New Hampshire Medical Society.

SUBSCRIPTION TERMS: $8.00 per year in advance, postage paid, for the United States (medical students, $4.00 per year); Canada, $9.00 per year (Boston funds); foreign, $10.50 per year.

MICROFILM volumes available to regular subscribers through University Microfilms, 313 N. First Street, Ann Arbor, Michigan.

MATERIAL, other than original articles, should be received not later than noon on Thursday, three weeks before date of publication.

THE JOURNAL does not hold itself responsible for statements made by any contributor.

COMMUNICATIONS should be addressed to the *New England Journal of Medicine*, 8 Fenway, Boston 15, Massachusetts. Telephone KE 6-2094.

MEETING OF THE COUNCIL

THE Council of the Massachusetts Medical Society held its regular midwinter meeting at the Boston Medical Library on February 7, 1951, with 233 councilors present. In spite of the usual sallies, excursions and alarums, an imposing amount of business was dispatched with speed and efficiency. This can be attributed to a commendable attention to the affairs of the Society on the part of committees and their chairmen, an increasingly effective functioning of the Executive Committee and an admirable mastery of parliamentary detail by the President and the Secretary.

Early on the agenda of the meeting was the following resolution, introduced by Dr. Harvey A. Kelly, executive councilor of the Suffolk District Society; this resolution had been adopted by the Suffolk councilors and approved by the Executive Committee:

> That the delegates of the Massachusetts Medical Society to the House of Delegates of the American Medical Association be requested to have the House of Delegates take such action as will assure that the *Journal of the American Medical Association* welcome and provide space for the presentation of considered discussion from varying points of view on problems pertaining to medical education and the availability, cost, distribution and organization of medicine.

This resolution was unanimously adopted by the Council.

The matter of changing the status of the Committee on National Legislation, now a subcommittee of the Committee on Legislation, to that of a special committee was referred to the Committee on Council Rules and By-laws.

The report of the Committee on Finance precipitated the expected minor skirmish in the Battle of the Budget — a healthy sign, indicating that the Society is functioning in a sound and normal fashion, with due regard to both its obligations and its resources. The major issue was the budgetary request of the department of medical information and education, which, after thorough ventilation, was endorsed by a definite majority of the Council.

Arguments centered in particular on the *News Letter* of the Director of Medical Information and Education and the possibility that the *Journal* might assume the responsibility of its production. The point was emphasized that the time factor involved in publication and distribution made it impossible for the *Journal* to meet the schedule of the *News Letter*. The *Journal* nevertheless reiterates its readiness to serve the purposes of the Society in any way possible.

The recommendation that an advisory committee to the department of information and education be established was referred to the Committee on Council Rules and By-laws.

In view of the current discussion regarding the refilling of prescriptions, the Committee on Pharmaceutical Problems asked the Council to recommend that no fee be charged by a physician when the only service rendered is the approval of such a refill. It is difficult, of course, to make blanket recommendations to cover every case, and the

Council's approval of this request will no doubt be interpreted as a timely suggestion.

The motion introduced by Dr. Carl Bearse, of Norfolk, that a board of trustees be established by the Society to oversee its fiscal affairs was referred to the Committee on Council Rules and By-laws.

Mindful of the fact that the opponents of animal experimentation in the interests of humanity are falsely stating that many physicians are also opposed to this practice, the Council, under suspension of rules, unanimously adopted a resolution favoring the Pound Bill now before the Legislature.

THE TRAINING OF INTERNS AND RESIDENTS

Physicians in general agree that acceleration of medical education by compressing a four-year course into three years and the "9-9-9" plan for the training of interns and residents — two expedients used during World War II — were not successful. Neither the education nor the clinical training that resulted gave the men concerned so satisfactory a foundation of knowledge as had resulted from the system that hitherto had been in operation.

The country now faces another period in which medical manpower must be mobilized for national service. Once again the problem of how best to produce large numbers of well trained doctors without waste of time is under study.

Present thinking offers hope that the medical-school course of four calendar years may remain unchanged so far as time allotment is concerned but that summer vacation periods may be shortened to one month, the extra time thus gained being used for the teaching of new subjects essential for national welfare and security in time of emergency.

On the other hand, it is suggested that each medical graduate may be permitted only a twelve-month internship before he enters national service and, in addition, that only a limited number may be deferred from active duty for a second year to serve as residents in hospitals that require a resident staff as well as an intern staff in order to guarantee adequate care of patients. More formal and prolonged postgraduate training at the residency level will be available only to men returning from active service, to men who for physical reasons are unfitted for active duty and to women. If such restrictions in the postgraduate training of young doctors are necessary because of the national emergency, they must be accepted. Should the emergency continue for any great length of time, however, the future care of national health may be injured. Large numbers of imperfectly trained doctors cannot be an asset to the proper care of sick people. A warning to this general effect is contained in the report of a special committee of the American College of Surgeons, and has been sent to the President of the United States and other Government officials.

At the meeting of the American College of Physicians in Boston last April, Dr. Henry A. Christian* spoke on certain present-day undesirable trends in the training of physicians and teachers of internal medicine. Based on a study of the plans used in seventy-five teaching and nonteaching hospitals, he concluded that very few American hospitals were giving good clinical instruction. With all interns starting their work on the same day, as was the prevailing custom, it seemed almost impossible to offer what was needed: an orderly progression in responsibility, desirable both for the best care of patients and for the training of young physicians.

He believes that an internship in medicine should be of twenty-four months' duration and should include four distinct phases of work: a period in the laboratory during which the intern performs routine laboratory studies and learns how to perform more complicated ones, while seeing the patients on daily ward visits; a period chiefly spent in history taking and physical examination of patients; a period of greater responsibility in which the intern is concerned chiefly with physical examinations, planning and ordering laboratory studies and ordering and directing treatment, all under strict supervision of a well trained clinician

*Christian, H. A. Present-day undesirable trends in the training of physicians and of teachers of internal medicine. *Ann. Int. Med.* **33**:533-543, 1950.

of the visiting staff and a period in the outpatient department, where the intern is responsible for the examination and care of ambulatory patients, much as a practicing physician takes charge of office patients. As part of this program, interns should attend ward rounds regularly, without too many didactic conferences of any sort, and should receive continuous instruction, direction and criticism from the visiting staff on duty, one member making a formal ward visit each day.

Such a concept of the educational programs for hospitals that wish to attract interns is admirable. Indeed, few hospitals can expect to procure interns unless they offer a well constructed plan of supervised training.

A year's internship, which seems likely to be the general practice so long as the national emergency lasts, is too short to afford the experience that Dr. Christian considers most desirable. Nevertheless, any hospital that hopes to be regarded as offering a useful internship should consider seriously his views. It should attempt to develop as best it can a system for intern training that affords an orderly progression in responsibility and experience. For, as he says, this not only is the basis for the first step in the further training of young doctors after they graduate from medical school but also is necessary for the best care of patients.

MAKING AGE LESS CRABBED

Old is twenty years older than one happens to be at the moment. Who, then, can say what the proper retirement age is? Sonja Henie stopped doing her most beautiful and most difficult figures by the age of thirty and became a producer. Joe Louis at thirty-five has found it necessary to return from retirement to repair his fortunes. Emeritus professors of medicine at sixty-five must fall back on their consultations and their acid comments on the bright young men.

What is a reasonable substitute for the social and economic euthanasia that is now employed? A limited number of places are available as chairmen of boards, crossing tenders, night watchmen and baby sitters. Old-age relief is limited by the money spent on killing or preparing to kill the youth.

Dr. Robert T. Monroe, who has given considerable attention to these problems, has recently submitted some apposite comments to the Committee on Public Health of the Massachusetts Medical Society.

There is no clear correlation, as Monroe points out, between chronologic age and performance, disability depending rather on personal factors and on recognizable disease than on number of years. In some areas of human endeavor, as in statesmanship, finance and many professions, performance increases with age; in others the peak of performance comes relatively early in life. In a tight labor market, many past the retirement age are found employable.

The aged, therefore, constitute a marginal manpower reserve that could be kept at its best by part-time employment, rotating employment among the segments of the aged population.

In the general economy, moreover, compulsory retirement in industry at the age of sixty-five denies to many persons their right to maintain themselves as independent members of society for as long as they are willing and capable of such action. A combined operation between industry and Government relief agencies might reduce relief expenditures, improve individual standards of living, and consequently both physical and mental health, and ensure extra hands in time of labor shortage. Everyone would gain by maintaining skills as well as life in the older members of society.

As Charles Lamb once tactfully put it,

> Let me caution persons grown old in active business, not lightly, nor without weighing their own resources, to forego their customary employment all at once, for there may be danger in it.

Geriatrics is medicine in its broad sense applied to a special age group. This means medical care in addition to physiologic and psychologic appraisal, research in chronic disease and rehabilitation. Finally, social, economic and political technics must be employed to preserve and enhance the dignity of the aged person. This is a part of the meaning of democracy.

POSTGRADUATE LECTURE COURSE, 1951

THE program of the sixth postgraduate lecture course presented by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health appears elsewhere in this issue of the *Journal*. The course, which has been arranged by the highly qualified Committee on Postgraduate Medical Education, will be given again in Ware Hall at the Boston Medical Library, 8 Fenway, Boston.

Sixteen sessions will be held — two more than last year — beginning on March 5 with a symposium on civilian defense measures and ending on May 2 with a session on obstetrics. A number of interesting developments will be revealed between inception and delivery. As usual, the Monday sessions will begin at 7 and end at 9 p.m.; the Wednesday sessions will be held from 4 to 6 in the afternoon.

The course is conducted primarily for the benefit of all physicians of Massachusetts and its adjacent states, regardless of state-society membership. In addition, medical officers, hospital residents and interns and medical students are especially invited to avail themselves of this unique opportunity.

Trial of a Regular Physician for Consulting with Homœopaths. — . . . *Several charges were brought against Dr. H., the one of most general interest being that of consulting, in a surgical case, with two homœopathic physicians.*

Boston M. & S. J., *February 26, 1851*

Fourth-year students in approved medical schools are reminded that the *Journal's* prize essay contest closes on March 15, by which date manuscripts must be in the hands of the editor.

For further information the reader is referred to the *Journal* of September 28, 1950, page 508.

MASSACHUSETTS MEDICAL SOCIETY

TREASURER'S OFFICE

This year the Committee on Finance has voted a refund of $4000 to the district societies from the surplus in the General Fund at the end of 1950.

Members are reminded that the percentage of this sum that is allocated to their own district is determined by the number of dues from that district paid by March 1, 1951. Members who have not paid their dues by this date are automatically removed from the mailing list of the *Journal* until such dues are paid.

ELIOT HUBBARD, JR.
Treasurer

DEATH

LOOFBOUROW — Dorothea G. Loofbourow, M.D., of Cambridge, died on January 31. She was in her forty-ninth year.

Dr. Loofbourow received her degree from the University of Cincinnati College of Medicine in 1941. She was formerly graduate assistant in medicine at the Massachusetts General Hospital and in 1944 became assistant in medicine.

A son, a sister and three brothers survive.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS

The March schedule for Consultation Clinics for Crippled Children in Massachusetts under the provisions of the Social Security Act follows:

ORTHOPEDIC CLINICS	DATE	CLINIC CONSULTANT
Greenfield	March 1	Charles L. Sturdevant
Lowell	March 2	Albert H. Brewster
Salem	March 5	Paul W. Hugenberger
Haverhill	March 7	William T. Green
Brockton	March 8	George W. Van Gorder
Lynn*	March 12	Daniel M. Killoran John J. Crowley
Gardner	March 13	Carter R. Rowe
Springfield	March 20	Garry deN. Hough, Jr.
Hyannis	March 22	Paul L. Norton
Worcester	March 23	John W. O'Meara
Fall River	March 26	David S. Grice

RHEUMATIC FEVER CLINICS	DATES
North Reading	March 6, 13, 20, 27
Fitchburg	March 7, 14, 21, 28

PLASTIC CLINICS	CONSULTANT
Eastern Massachusetts	Bradford Cannon Semi-monthly
Western Massachusetts	Joseph M. Baker Monthly

Physicians referring new patients to clinics should get in touch with the district health officer to make appointments. Patients are seen by appointment only.

*The clinic serves Lynn, Lynnfield, Saugus, Nahant, Revere, Chelsea, Everett, and Winthrop. Referrals should be made directly to the Lynn Hospital.

POSTGRADUATE LECTURE COURSE

The sixth Postgraduate Lecture Course, which has been arranged by the Committee on Postgraduate Medical Education of the Massachusetts Medical Society, in co-operation with the Massachusetts Department of Public Health, will begin on March 5. The meetings will be held in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. The lectures are designed for all physicians of Massachusetts and surrounding states, medical officers, hospital residents, interns, medical students and postgraduate students. Registration is free, and membership in the Massachusetts Medical Society is not required for admission.

The detailed program of the course, which will be given in the evenings on Mondays and the afternoons on Wednesdays, is as follows:

Monday, March 5. CIVILIAN DEFENSE MEASURES. Chairman: Donald E. Currier.

7:00. **Opening Remarks.** Leland S. McKittrick, President, Massachusetts Medical Society.

7:05–7:40. **Basic Plans for Civilian Defense.** Charles H. Bradford, assistant professor of orthopedic surgery, Boston University School of Medicine, and member, surgical staff, Mt. Auburn, Boston City, and Malden hospitals.

7:40–8:20. **Treatment of Atomic Bomb Casualties.** James H. Jackson, assistant in medicine, Peter Bent Brigham Hospital.

8:20–9:00. **Atomic Bomb — Its History and Its Physics.** Donald E. Currier, chairman of the Committee on Emergency Medical Service of the Massachusetts Medical Society, surgeon general of the Commonwealth of Massachusetts, and staff member, Mt. Auburn Hospital.

Wednesday, March 7. ALLERGY. Chairmen: Walter S. Burrage and John L. Fromer.

4:00–4:30. **ACTH in Allergic Dermatosis.** John L. Fromer, head of Department of Allergy and Dermatology, Lahey Clinic and dermatologist, New England Deaconess and New England Baptist hospitals.

4:30–5:00. **Present Status of ACTH in Asthma.** Walter S. Burrage, assistant professor of medicine, Harvard Medical School, assistant physician, Massachusetts General Hospital and physician, New England Deaconess Hospital.

5:00–5:30. **Pulmonary Function Tests in Asthma.** Francis C. Lowell, associate professor of medicine, Boston University School of Medicine and chief of allergy, Outpatient Department, Massachusetts Memorial Hospitals.

5:30–6:00. **Nose, Throat and Sinuses in Asthma.** Francis L. Weille, instructor in otolaryngology, Harvard Medical School and surgeon, Massachusetts Eye and Ear Infirmary and Massachusetts General Hospital.

Monday, March 12. INFECTIOUS DISEASES AND ANTIBIOTIC THERAPY. Chairmen: Donald S. King and Louis Weinstein.

7:00–7:25. **Streptococcal Infections and Rheumatic Fever.** Benedict F. Massell, associate research director, House of the Good Samaritan and chief of rheumatic fever division, Children's Hospital.

7:30–7:55. **The Pneumonias: Their Diagnosis and Treatment.** Maxwell Finland, associate professor of medicine, Harvard Medical School, chief, Fourth Medical Service, Boston City Hospital, and associate director, Thorndike Laboratory, Boston City Hospital.

8:00–8:25. **The Diagnosis and Treatment of Bacterial Meningitis.** John A. V. Davies, assistant clinical professor of pediatrics, Harvard Medical School and chief, Private Medical Service, Children's Medical Center.

8:30–8:55. **The Use of Antibiotics in the Treatment of Tuberculosis.** Donald S. King, Board of Consultation, Massachusetts General Hospital and consultant in tuberculosis, Veterans Administration.

Wednesday, March 14. INFECTIOUS DISEASES AND ANTIBIOTIC THERAPY. Chairmen: Donald S. King and Louis Weinstein.

4:00–4:25. **The Treatment and Prevention of Diphtheria, Tetanus, and Pertussis.** R. Cannon Eley, director of Postgraduate Courses, Children's Medical Center and Harvard Medical School.

4:30–4:55. **The Use of Antibiotics in Children.** Harry Shwachman, associate in pediatrics, Harvard Medical School and chief, Division of Clinical Laboratory, Children's Hospital.

5:00–5:25. **The Communicability of Infectious Diseases and the Influence of Chemotherapy.** Conrad Wesselhoeft, emeritus professor of clinical medicine, Boston University School of Medicine.

5:30–5:55. **Nervous-System Disturbances in Some of the Common Infectious Diseases.** Louis Weinstein, associate professor of medicine, Boston University School of Medicine, lecturer in infectious diseases, Harvard Medical School and chief, Infectious Disease Service, Massachusetts Memorial Hospitals.

Monday, March 19. NO LECTURE.

Wednesday, March 21. CARDIOVASCULAR DISEASES. Chairmen: Dwight E. Harken and Robert S. Palmer.

4:00–4:20. **Signs and Symptoms of a Normal Heart.** Edward F. Bland, clinical associate in medicine, Harvard Medical School, physician, Massachusetts General Hospital, chief, Cardiac Clinics and Laboratory, Massachusetts General Hospital and visiting physician, House of the Good Samaritan.

4:25–4:45. **Signs and Symptoms of a Nervous Heart.** Edwin O. Wheeler, assistant in medicine, Harvard Medical School and assistant in medicine, Massachusetts General Hospital.

4:50–5:10. **Practical Psychotherapy of the Nervous Heart and Effort Syndrome.** Mandel E. Cohen, instructor in medicine and psychiatry, Harvard Medical School and research and clinical fellow, Massachusetts General Hospital.

5:15–5:35. **Thyroid Heart — Difference from the Nervous Heart — Laboratory Diagnosis and Treatment, Especially Use of Radioactive Iodide.** John B. Stanbury, associate in medicine, Harvard Medical School and assistant in medicine, Massachusetts General Hospital.

5:40–6:00. **Summary.** Paul D. White, consultant, Massachusetts General Hospital, executive director, National Advisory Heart Council and consultant, National Heart Institute.

Monday, March 26. CARDIOVASCULAR DISEASES. Chairmen: Dwight E. Harken and Robert S. Palmer.

7:00–7:25. **The Surgery of Congenital Heart Disease.** Richard H. Sweet, associate clinical professor of surgery, Harvard Medical School, visiting surgeon, Massachusetts General Hospital and general and thoracic surgeon, New England Deaconess and Palmer Memorial hospitals.

7:25–7:30. **Discussion.**

7:30–9:00. **The Surgery of Acquired Heart Disease (a panel discussion on Angina Pectoris, Valvular Stenosis, Constrictive Pericarditis and Aneurysms).** Laurence B. Ellis, assistant clinical professor of medicine, Harvard Medical School, associate physician, Thorndike Memorial Laboratory and director, Cardiac Clinic, Boston City Hospital. Samuel A. Levine, clinical professor of medicine, Harvard Medical School and physician, Peter Bent Brigham Hospital. James C. White, associate professor of surgery, Harvard Medical School and chief, Department of Neurosurgery, Massachusetts General Hospital.

Wednesday, March 28. THYROID DISEASE. Chairmen: Elmer C. Bartels and Earle M. Chapman.

4:00–4:25. **Present Status of the Antithyroid Drugs.** Mark F. Lesses, instructor in medicine, Harvard Medical School and Tufts College Medical School and visiting physician and head of Endocrine Clinic, Beth Israel Hospital.

4:25–4:50. **Management of Hyperthyroidism in the Pregnant Patient.** George O. Bell, Department of Internal Medicine, Lahey Clinic, New England Deaconess and New England Baptist hospitals.

4:50–5:15. **Surgery of the Thyroid Gland — Consideration of the Single Nodule.** Richard B. Cattell, surgeon, Lahey Clinic and New England Baptist Hospital and surgeon-in-chief, New England Deaconess Hospital.

5:15–5:35. **The Use of Radioactive Iodine in Hyperthyroidism.** Earle M. Chapman, associate in medicine, Harvard Medical School and associate physician, Massachusetts General Hospital.

5:35–6:00. **The Use of Radioactive Iodine in Carcinoma of the Thyroid Gland.** Brown Dobyns, associate professor of surgery, Harvard Medical School and associate surgeon, Massachusetts General Hospital.

Monday, April 2. Clinical Use of ACTH and Cortisone. Chairmen: Peter H. Forsham and Thomas F. Frawley.

7:00–7:25. **General Principles in the Therapeutic Use of ACTH and Cortisone.** Peter H. Forsham, instructor in medicine, Harvard Medical School and junior associate in medicine, Peter Bent Brigham Hospital.

7:30–7:50. **ACTH and Cortisone in Rheumatoid Arthritis.** Theodore B. Bayles, clinical associate in medicine, Harvard Medical School, associate in medicine, Peter Bent Brigham Hospital and director of research, Robert Breck Brigham Hospital.

7:55–8:15. **ACTH and Cortisone in Rheumatic Fever and Allied Disorders.** Benedict F. Massell, associate research director, House of the Good Samaritan and chief, Rheumatic Fever Division, Children's Hospital.

8:20–8:40. **ACTH and Cortisone in Diseases of the Skin.** Walter F. Lever, instructor in dermatology, Harvard Medical School, associate in dermatology, Peter Bent Brigham Hospital and assistant in dermatology, Massachusetts General Hospital.

8:45–9:00. **Discussion.**

Wednesday, April 4. Clinical Use of ACTH and Cortisone. Chairmen: Peter H. Forsham and Thomas F. Frawley.

4:00–4:25. **Complications and the Safe Use of ACTH and Cortisone.** Thomas F. Frawley, assistant professor of medicine, Albany Medical College, research fellow, Harvard Medical School and assistant in medicine, Peter Bent Brigham Hospital.

4:30–4:50. **Use of ACTH and Cortisone in Surgery.** David Hume, associate in surgery, Harvard Medical School and associate in surgery, Peter Bent Brigham Hospital.

4:55–5:15. **ACTH and Cortisone in Renal Disease.** John P. Merrill, instructor in medicine, Harvard Medical School and junior associate in medicine, Peter Bent Brigham Hospital.

5:20–5:45. **ACTH and Cortisone in Diseases of the Eye.** Garrett L. Sullivan, instructor in ophthalmology, Harvard Medical School, assistant surgeon, Massachusetts Eye and Ear Infirmary and associate ophthalmologist, Children's Hospital.

5:45–6:00. **Discussion.**

Monday, April 9. Diabetes Mellitus. Chairmen: Howard F. Root and James H. Townsend.

7:00–7:20. **Detection and Diagnosis.** Harry Blotner, associate visiting physician, Beth Israel Hospital and chairman, Diabetes Detection Committee of the New England Diabetes Association.

7:25–7:45. **Complications: It Pays to Control Diabetes.** Howard F. Root, associate in medicine, Harvard Medical School and physician-in-chief, New England Deaconess Hospital.

7:50–8:10. **NPH Insulin.** Priscilla White, physician, New England Deaconess Hospital.

8:15–8:35. **The Diabetic Patient Facing Surgery.** James H. Townsend, clinical professor of medicine, Tufts College Medical School and chief, Medical Service, Mt. Auburn Hospital.

8:40–9:00. **Treatment of Diabetic Acidosis.** Reed Harwood, assistant physician, Massachusetts General Hospital.

Wednesday, April 11. Symposium on Acute Upper Abdominal Emergencies. Chairmen: Samuel F. Marshall and Claude E. Welch.

4:00–4:25. **Management of Upper Gastrointestinal Hemorrhage.** Richard Warren, clinical associate in surgery, Harvard Medical School, assistant in surgery, Massachusetts General Hospital, senior consultant in surgery and consultant in vascular surgery, West Roxbury Veterans Hospital.

4:25–4:30. **Question Period.**

4:30–4:55. **The Diagnosis and Treatment of Perforated Duodenal Ulcers.** Charles B. Burbank, assistant in surgery, Harvard Medical School and assistant in surgery, Massachusetts General Hospital.

4:55–5:00. **Question Period.**

5:00–5:25. **Surgery of Acute Cholecystitis.** Frederick P. Ross, chief, Surgical Service, West Roxbury Veterans Hospital.

5:25–5:30. **Question Period.**

5:30–5:55. **Acute Pancreatitis.** Kenneth W. Warren, surgeon, Lahey Clinic.

5:55–6:00. **Question Period.**

Monday, April 16. No lecture.

Wednesday, April 18. Backache. Chairmen: Edwin F. Cave and Thomas B. Quigley.

4:00–4:20. **Medical Aspects of Backache.** Perry J. Culver, associate in medicine, Harvard Medical School and assistant physician, Massachusetts General Hospital.

4:20–4:40. **The Painful Back in Industry.** Alexander P. Aitken, clinical professor of orthopedic surgery, Tufts College Medical School and visiting surgeon, Boston City, Faulkner, Brooks and Winchester hospitals.

4:40–5:00. **Management of Acute Back Pain.** Meier Karp, instructor in orthopedics, Harvard Medical School, associate in orthopedic surgery, Peter Bent Brigham Hospital, assistant visiting orthopedic surgeon, Beth Israel Hospital, associate in orthopedic surgery, Children's Hospital and attending orthopedic surgeon, Cushing Veterans Administration Hospital.

5:00–5:20. **Management of Chronic Back Pain.** Carter R. Rowe, assistant in orthopedic surgery, Massachusetts General Hospital and Harvard Medical School.

5:20–6:00. **Questions and General Discussion.**

Monday, April 23. Genitourinary Diseases. Chairmen: Richard Chute and Wyland F. Leadbetter.

7:00–7:35. **Sinister Significance of Hematuria.** Lorande M. Woodruff.

7:35–7:40. **Question Period.**

7:40–8:15. **Diagnosis and Treatment of Pyuria.** George Austen, Jr., instructor in surgery, Harvard Medical School and associate in urology, Peter Bent Brigham Hospital.

8:15–8:20. **Question Period.**

8:20–8:55. **Differential Diagnosis and Treatment of Lesions of the Penis and Scrotum.** Sylvester B. Kelley, assistant in surgery, Harvard Medical School, assistant visiting urologist, Massachusetts General Hospital and consultant in urology, Waltham and Symmes hospitals.

8:55–9:00. **Question Period.**

Wednesday, April 25. Gastroenterology. Chairmen: Benjamin M. Banks and Everett D. Kiefer.

4:00–4:30. **Evaluation of Some of the Newer Methods in the Treatment of Peptic Ulcer.** Franz J. Ingelfinger, associate professor of medicine, Boston University School of Medicine and visiting physician, Massachusetts Memorial Hospitals.

4:30–4:40. **Discussion.**

4:40–5:10. **Chronic Relapsing Pancreatitis.** Francis E. McDonough, physician, Department of Gastroenterology, Lahey Clinic and member, associate staffs of the New England Deaconess and New England Baptist hospitals.

5:10–5:20. **Discussion.**

5:20–5:50. **Disease of the Small Intestine.** Arnold Starr, clinical professor of surgery, Tufts College Medical School, instructor in surgery, Harvard Medical School and visiting surgeon, Beth Israel Hospital.

5:50–6:00. **Discussion.**

Monday, April 30. GYNECOLOGY. Chairmen: Langdon Parsons and Somers H. Sturgis.

7:00–7:45. **Abnormal Uterine Bleeding.** Moderator: Somers H. Sturgis. Janet McArthur, instructor in pediatrics, Harvard Medical School and assistant in medicine, Massachusetts General Hospital. George W. Mitchell, instructor in gynecology, Tufts College Medical School and instructor in gynecology, Postgraduate Division, Tufts College Medical School.

7:45–8:15. **Urinary Incontinence.** Louis E. Phaneuf, professor of gynecology, Tufts College Medical School, surgeon-in-chief, Department of Obstetrics and Gynecology, Carney Hospital and surgeon-in-chief, Department of Gynecology, Boston Dispensary.

8:15–9:00. **Pruritus Vulvae.** Moderator: Langdon Parsons. Howard Ulfelder, clinical associate in surgery, Harvard Medical School and clinical associate in gynecology, Massachusetts General Hospital. William Hill, assistant in dermatology and medicine, Harvard Medical School and assistant in dermatology and medicine, Massachusetts General Hospital.

Wednesday, May 2. OBSTETRICS. Chairmen: Harold H. Rosenfield and Benjamin Tenney, Jr.

4:00–4:25. **Modern Trends in Obstetrics.** Duncan E. Reid, professor of obstetrics, Harvard Medical School.

4:30–5:00. **Tuberculosis in Pregnancy.** Theodore S. Badger, consultant in diseases of the chest, West Roxbury and Cushing Veterans hospitals and assistant visiting physician, Boston City Hospital.

5:00–5:30. **Asphyxia Neonatorum: Effects of Various Sedatives and Asphyxia in General.** Franklin F. Snyder, associate in obstetrical research, Boston Lying-in Hospital.

5:35–6:00. **The Kidney and Its Relation to Toxemia of Pregnancy: Use of Protoveratrine in Preëclampsia.** Edward Meilman, instructor in medicine, Harvard Medical School and research associate, Beth Israel Hospital.

BOOK REVIEW

Races: A study of the problems of race formation in man. By Carleton S. Coon, Ph.D., Stanley M. Garn, Ph.D., and Joseph B. Birdsell, Ph.D. 8°, cloth, 153 pp., with 15 plates. Springfield, Illinois: Charles C Thomas, 1950. $3.00. (American Lecture Series.)

This monograph, which is the seventy-seventh publication in the American Lecture Series, is the first in a projected group on physical anthropology, and aims to study and explain the genesis of the 30 races now extant on earth. This study of the problems of race formation in man takes into account all possible factors of environment, the relations of physiology and behavior, genotypes and phenotypes, mutation and selection, breeding habits, isolation and incorporation, adaptive changes and evolutionary status. Of special interest to physicians is the discussion of the long-range effect, from the anthropologic standpoint, of sanitation on civilization and of disease selection on resistance and survival.

The classification of races that the authors propose and their theories of racial variations in man are their own, and their presentation constitutes an extremely provocative and stimulative study and exposition. The book is well illustrated with representative individual photographs of all the racial types, as well as a map of their distribution, and with six admirable anatomic drawings by Mr. Robert Ullrich. There is an excellent bibliography of 91 selected titles.

NOTICES

BOSTON CHAPTER OF AMERICAN FEDERATION FOR CLINICAL RESEARCH

A meeting of the Boston Chapter of the American Federation for Clinical Research will be held at the Massachusetts General Hospital on February 26 at 8 p.m.

PROGRAM

Results of Feeding Desiccated Thyroid to Thyrotoxic Subjects. M. A. Greer. New England Center Hospital and Tufts College Medical School.

Results of Experimental Pericardial Tamponade on Pressures in the Pulmonary Circulation. C. S. Burwell, J. W. Woodbury, V. Richards and J. Metcalfe. Peter Bent Brigham Hospital and Harvard Medical School.

Studies on the Effect of Myocardial Infarction on Blood Coagulation. R. Ohler, W. C. Moloney and D. Blacklow. Veterans Administration Hospital, Togus, Maine, Boston City Hospital and Tufts College Medical School.

Hematological Effects of ACTH and Cortisone Therapy in Rheumatoid Arthritis and Allied Disorders. C. L. Crockett, Jr., S. Finch, J. F. Ross and T. B. Bayles. Evans Memorial, Peter Bent Brigham and Robert Breck Brigham hospitals, Boston University and Harvard Medical schools.

The Effect of Mild Diabetes and Insulin on Heart-Muscle Metabolism in Man. W. T. Goodale, R. E. Olson and D. B. Hackel. Peter Bent Brigham Hospital and Harvard Medical School.

BOSTON CITY HOSPITAL HOUSE OFFICERS' ASSOCIATION

The Boston City Hospital House Officers' Association will present the following lectures, to be given in the Dowling Amphitheater at 7 p.m., in its evening lecture series.

Tuesday, February 27. Medical and Surgical Treatment of Hypertension. Reginald H. Smithwick, M.D., and Robert W. Wilkins, M.D., of the Massachusetts Memorial Hospitals, Boston.

Tuesday, March 6. The Diagnosis and Treatment of Multiple Myeloma. William C. Moloney, M.D., clinical professor of medicine, Tufts College Medical School.

Monday, March 12. Studies on the Cellular Physiology of Bacteremia. W. Barry Wood, M.D., professor of medicine, Washington University Medical School.

All interested persons are invited to attend.

AARON BROWN LECTURE

The first annual Aaron Brown Memorial Lecture, sponsored by Alpha Omicron Chapter of Phi Delta Epsilon Fraternity, will be given on Thursday, March 1, at 5:00 p.m., in the amphitheater of the Boston University School of Medicine, 80 East Concord Street, Boston.

Dr. Ephraim Shorr, associate professor of medicine at Cornell University Medical College, will lecture on "Participation of Vasoactive Hepatorenal Principles in Experimental Renal and Human Essential Hypertension."

All interested persons are invited to attend.

NEW ENGLAND HOSPITAL

The monthly clinical conference and meeting of the staff of the New England Hospital will be held in the conference room of the hospital on Thursday, March 1, at 7:15 p.m. Dr. Miriam G. Katzeff will speak on the subject "Eosinophilic Granuloma: Case Presentation and Discussion." Dr. Annella Brown will be chairman.

MASSACHUSETTS SOCIETY OF ANESTHESIOLOGISTS

The fifth session of the postgraduate education course of the Massachusetts Society of Anesthesiologists will be held in the Bigelow Amphitheater of the Massachusetts General Hospital on Saturday, March 3, from 2:30 to 5:00 p.m. The subject of the course will be "Pathology of the Respiratory System and the Physiologic Changes That Would Influence the Conduct of Anesthesia." Dr. William S. Derrick of the Peter Bent Brigham Hospital will be chairman.

PROGRAM

Pathology of the Respiratory System. William H. Meissner, M.D., of the Deaconess Hospital.

Some Aspects of Pathologic Respiratory Physiology. Stanley Sarnoff, M.D., of the Harvard School of Public Health.

Management of Respiratory Problems in Clinical Anesthesia. Gilbert Gross, M.D., of the Peter Bent Brigham Hospital.

PSYCHIATRIC TRAINING FACULTY

The Psychiatric Training Faculty of Massachusetts, Inc., announces that applications are being accepted for residency training in psychiatry and neurology. Residency salaries are available that permit immediate placement of applicants who have satisfactorily met the requirements of the faculty. The following affiliated units are utilized in planning the training program for each individual resident: Boston Psychopathic Hospital, Boston State Hospital, The Judge Baker Guidance Center, Massachusetts General Hospital, Massachusetts Memorial Hospitals, and Worcester State Hospital. Opportunity is also afforded for psychoanalytic training for a limited number of candidates under the auspices of the Boston Psychoanalytic Institute. Arrangement for such training is dependent on acceptance by the Institute. Applications should be made on a form obtained from the Psychiatric Training Faculty, Room 800, 15 Ashburton Place, Boston 8, Massachusetts.

SPRINGFIELD HOSPITAL

The educational program of the Springfield Hospital for the month of March is as follows:

Saturday, March 3.
9–10 a.m. Grand Surgical Rounds.
10–11 a.m. Radiology Conference (topic to be announced) in the Staff Conference Room. Dr. John W. Turner.
11 a.m.–12 m. Combined Medical-Surgical Grand Rounds in the Staff Conference Room.

Thursday, March 8.
12:15 p.m. Staff Meeting in the Staff Room.

Saturday, March 10.
9–10 a.m. Grand Surgical Rounds.
10–11 a.m. Seminar on Surgical Principles in the Staff Conference Room on the subject "Breast Surgery." Dr. Omar T. Pace.
11 a.m.–12 m. Clinicopathological Conference in the Staff Conference Room.

Wednesday, March 14.
12:15 p.m. Psychosomatic-Medicine Conference in the Staff Conference Room on the subject "Convulsive Disorders." Dr. Calvert Stein.

Saturday, March 17.
9–10 a.m. Grand Surgical Rounds.
10–11 a.m. Pathology Conference: Seminar on Hematology (continued) in the Staff Conference Room. Dr. William Kaufmann.
11 a.m.–12 m. Medical-Death Review in the Staff Conference Room.

Tuesday, March 20.
8:30 p.m. Guest Speaker Conference in the Staff Conference Room on the subject "Arteriosclerosis of the Lower Extremities." Dr. Edward A. Edwards, associate in surgery, Peter Bent Brigham Hospital and clinical associate in anatomy, Harvard Medical School.

Saturday, March 24.
9–10 a.m. Grand Surgical Rounds.
10–11 a.m. Seminar on Surgical Principles in the Staff Conference Room. "Thyroid, Thyroglossal Cyst, Branchial Cysts." Dr. W. Fenn Hoyt.
11 a.m.–12 m. Surgical Death Review in the Staff Conference Room.

Wednesday, March 28.
12 m.–1:30 p.m. Pediatric Conference in the Staff Conference Room. "Pyloric Stenosis." Dr. H. H. Shuman.

Saturday, March 31.
9–10 a.m. Grand Surgical Rounds.
10–11 a.m. Pathology Conference in the Staff Conference Room. "Liver Function Tests." Dr. William Kaufmann.

SOCIETY MEETINGS AND CONFERENCES

FEBRUARY 23. Bay State Hospital. Page 273, issue of February 15.
FEBRUARY 26. Boston Chapter of American Federation for Clinical Research. Page 313.
FEBRUARY 27. Boston City Hospital House Officers' Association. Page 313.
FEBRUARY 27. Norfolk District Medical Society. Page 629, issue of October 19.
FEBRUARY 27. Edward K. Dunham Lecture. Page 274, issue of February 15.
FEBRUARY 28. Massachusetts Physicians Art Association. Page 274, issue of February 15.
MARCH 1. Edward K. Dunham Lecture. Page 274, issue of February 15.
MARCH 1. New England Hospital. Page 313.
MARCH 1. Aaron Brown Lecture. Page 313.
MARCH 3. Massachusetts Society of Anesthesiologists. Notice above.
MARCH 3–31. Springfield Hospital. Notice above.
MARCH 5–8. New Orleans Graduate Medical Assembly. Page 1018, issue of December 21.
MARCH 5–MAY 2. Massachusetts Medical Society. Postgraduate Lecture Course. Page 311.
MARCH 6. Edward K. Dunham Lecture. Page 274, issue of February 15.
MARCH 6. Boston City Hospital House Officers' Association. Page 313.
MARCH 7. Hampshire District Medical Society. Page 170, issue of July 27.
MARCH 8. Some Fundamental Indications for the Use of Forceps. Dr. M. Fletcher Eades. Pentucket Association of Physicians. 8:30 p.m. Haverhill.
MARCH 8–APRIL 26. Seminars on Blood Cells and Plasma Proteins. Page 274, issue of February 15.
MARCH 11–16. College of Medical Evangelists. Page 74, issue of January 11.
MARCH 12. Boston City Hospital House Officers' Association. Page 313.
MARCH 13. Phi Delta Epsilon Lecture. Page 274, issue of February 15.
MARCH 16 AND 17. American College of Surgeons. Page 274, issue of February 15.
MARCH 21. A Demonstration of Pilot Wearers of Some of the Newer Devices in Prostheses. Dr. Augustus Thorndike. New England Society of Physical Medicine. Hotel Kenmore. 8 p.m.
MARCH 22. Hyman Morrison Lecture. Page 74, issue of January 11.
MARCH 26. Boston Lying-in Hospital Obstetric Round-Table Conference. Page 629, issue of October 19.
MARCH 26–28. American Academy of Pediatrics. Page 274, issue of February 15.
MARCH 27. Norfolk District Medical Society. Page 629, issue of October 19.
APRIL 9–13. American College of Physicians. Page 296, issue of June 15.
APRIL 10. New England Society of Anesthesiologists. Page 512, issue of September 28.
APRIL 18. Physical Medicine and Rehabilitation in Psychiatry. Dr. Walter E. Barton. New England Society of Physical Medicine. Hotel Kenmore. 8 p.m.
APRIL 24. Norfolk District Medical Society. Page 629, issue of October 19.
APRIL 28. American Psychosomatic Society. Page 198, issue of February 1.

DISTRICT MEDICAL SOCIETIES

HAMPSHIRE

MARCH 7. 4:30 p.m. Cooley-Dickinson Hospital, Northampton.
MAY 2. 4:30 p.m. Annual Meeting. Jones Library, Amherst.

NORFOLK

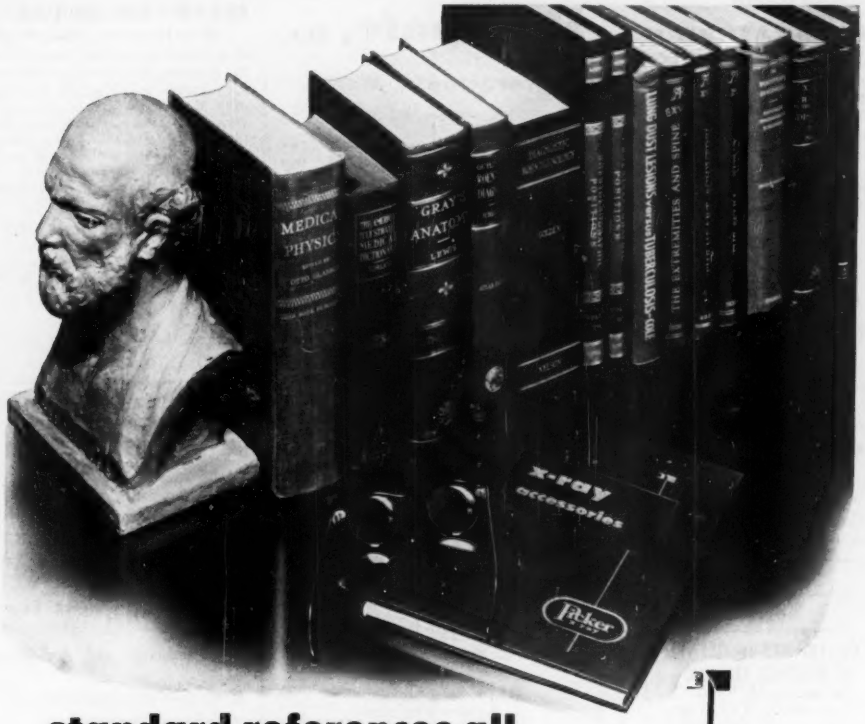
FEBRUARY 27.
MARCH 27.
APRIL 24.
MAY 9. Annual Dinner.
All meetings except the Annual Dinner will be held at the Boston Medical Library, 8 Fenway, at 8:00 p.m.

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING THURSDAY, MARCH 1

THURSDAY, MARCH 1

*9:00–10:00 a.m. Cardiac Grand Rounds. Main Amphitheater, Children's Medical Center.
*9:00–10:00 a.m. Grand Rounds. Robert Breck Brigham Hospital.
*9:00–11:00 a.m. Medical Grand Rounds. Joseph H. Pratt Diagnostic Hospital.
*5:00 p.m. Aaron Brown Lecture. Amphitheater, Boston University School of Medicine.
7:15 p.m. Clinical Conference and Staff Meeting. New England Hospital.

(*Notices concluded on page xi*)



standard references all

Companion to their other constantly-referred-to works (and considered virtually as indispensable) are the Picker X-Ray Accessory Catalogs on thousands of doctors' bookshelves.

This catalog has long been a standard reference for materials used in radiography, fluoroscopy, and radiation therapy . . . probably the most complete source book for x-ray accessories extant. Its two hundred pages embrace not only Picker-made products, but a host of others gathered from all over the world, and offered under the Picker guarantee. The wide range of the collection is evidence of our ceaseless search for better ways to serve you.

PICKER X-RAY CORPORATION
300 FOURTH AVENUE, NEW YORK 10, N. Y.

★ x-ray

all you expect . . . and more

BOSTON, MASS., 920 Beacon Street
NEW HAVEN 10, CONN., 185 Church Street

E. PROVIDENCE, R. I., 53 Waterman Avenue
W. HARTFORD, CONN., 172 Sidney Avenue

Founded 1879

RING SANATORIUM

For the study, care and treatment of emotional, mental, personality and habit disorders.

All recognized psychiatric therapies are used as indicated.

Cottage accommodations meet varied individual needs. Limited facilities for the continued care of progressive disorders requiring medical, psychiatric, or neurological supervision.

BENJAMIN SIMON, M.D.
Director

CHARLES E. WHITE, M.D.
LOUIS BRENNER, M.D.
FRED E. LAWRENCE, M.D.
Associates

Consultants in All Specialties

Arlington Heights, Mass. FRANCIS W. RUSSELL
Telephone AR 5-0081 *Executive Secretary*

WOODSIDE COTTAGES

FRAMINGHAM, MASS.

A sanitarium specially adapted for nervous and convalescent patients who need rest and upbuilding in normal surroundings.
No committed mental cases.
ARTHUR H. WARD, M.D., *Medical Director*

DAVID MEMORIAL NURSING HOME

BROOKLINE 46, MASS.
S. D. COHEN, R.N., *Supt.*
Convalescents—Invalid-Elderly
Special and diabetic diets
61 Park Street BE 2-3530

GLENSIDE

JAMAICA PLAIN, BOSTON, MASS.

A small, attractively located sanitarium for nervous, mild mental or chronic illnesses.

MABEL D. ORDWAY, M.D.
6 Parley Vale Tel. JA 4-0044

Baldpate, Inc.

Georgetown, Mass.

GEO 2131 — Boston Office BE 2-3911

For the treatment of psychoneuroses, personality disorders, psychoses, alcoholism and drug addiction.

Psychotherapy is the basis of treatment; other methods such as *shock therapy*, *malaria* and *fever box* are used when indicated.

Occupation under a trained therapist, diversions and outdoor activities.

GEORGE M. SCHLOMER, M.D.
Medical Director

WISWALL SANATORIUM

203 GROVE ST., WELLESLEY, MASS.

For the care of mild mental and nervous patients in country surroundings. Small grouping allows a homelike atmosphere and personal contact.

E. H. WISWALL, M.D.
Superintendent

HALE POWERS, M.D.
Resident Physician

Tel. WE 5-0261

PERKINS SCHOOL

LANCASTER, MASS.

Devoted to the scientific understanding and education of children of retarded development. Five homelike and attractive buildings surrounded by 85 acres of campus and gardens.

FRANKLIN H. PERKINS, M.D.

HANOVER HOUSE, INC.

West Hanover, Massachusetts

A sanatorium in the South Shore Area
Tel. Rockland 1690 — Quincy Office PR 3-6930
All modern facilities for the treatment of mild nervous disturbances and neurological diseases, psychosomatic disorders, personality problems. Exceptionally attractive private and recreational rooms for resident patients.
Outpatient treatment for referred cases only. No committed patients.

ELSIE S. NEUSTADT, M.D.
Medical Director

RUDOLPH NEUSTADT, M.D.
Clinical Director

HUNTLEY NURSING HOME

24-hour nursing care under the direction of
FANNIE R. C. HUNTLEY, R.N.
Newburyport, Mass.
14 TOPPANS LANE Telephone 105
Ambulance Service

A Request for Change of Address

Must reach us at least three weeks before the date of issue with which it is to take effect. Duplicate copies cannot be sent to replace those undelivered through failure to send such advance notice. With the new address be sure to send us the old one, enclosing, if possible, your address label from a recent copy.

NEW ENGLAND
JOURNAL OF MEDICINE
8 FENWAY, BOSTON 15, MASS.

NEW ENGLAND JOURNAL OF MEDICINE

ADVERTISING RATES

	1 time	3 times	6 times	13 times	26 times	52 times
One page (per insertion)	$200.00	$190.00	$180.00	$170.00	$160.00	$150.00
Half page (per insertion)	105.00	100.00	95.00	90.00	85.00	80.00
Quarter page (per insertion) .	57.50	55.00	52.50	50.00	47.50	45.00
Eighth page (per insertion) ..	30.00	28.75	27.50	26.25	25.00	23.75

Three-column rates on request

Preferred space: front cover, 200 per cent; back cover, 100 per cent; facing first text page, 50 per cent; facing last text page, page ii and page iii, 33⅓ per cent; other special positions, 10 per cent.

Minimum size, ⅛ page, measuring 3⅛ x 2 inches.

Inserts furnished by advertiser accepted at two-time page rate; color (one) available at $150.00 per page extra per issue; for all bleeds, add 10 per cent to usual charge.

NOTICES (*Concluded from page 314*)

FRIDAY, MARCH 2

*9:00–10:00 a.m. Medical Conference. Joseph H. Pratt Diagnostic Hospital.

*9:00 a.m.–12:00 m. Combined Medical and Surgical Staff Rounds. Peter Bent Brigham Hospital.

*10:00 a.m. Surgical Clinic. South End Health Unit, 57 East Concord Street, Boston.

*1:30 p.m. Tumor Clinic. Out-Patient Department, Mount Auburn Hospital, Cambridge.

SATURDAY, MARCH 3

*9:00–10:00 a.m. Surgical Grand Rounds. Joseph H. Pratt Diagnostic Hospital.

2:30–5:00 p.m. Postgraduate Education Course of the Massachusetts Society of Anesthesiologists. Massachusetts General Hospital.

MONDAY, MARCH 5

*11:30 a.m.–12:15 p.m. Clinical Conference. South End Health Unit. 57 East Concord Street, Boston. Dr. Cleaveland Floyd in charge.

*12:15–1:15 p.m. Clinicopathological Conference. Main Amphitheater, Peter Bent Brigham Hospital.

TUESDAY, MARCH 6

*9:00–10:00 a.m. Medical Conference. Joseph H. Pratt Diagnostic Hospital.

*12:15–1:15 p.m. Clinicoroentgenological Conference. Peter Bent Brigham Hospital.

*1:30–2:30 p.m. Pediatric Rounds. Burnham Memorial Hospital for Children. Massachusetts General Hospital.

*7:00 p.m. Boston City Hospital House Officers' Association. Dowling Amphitheater.

WEDNESDAY, MARCH 7

*9:00–10:00 a.m. Medical Conference. Joseph H. Pratt Diagnostic Hospital.

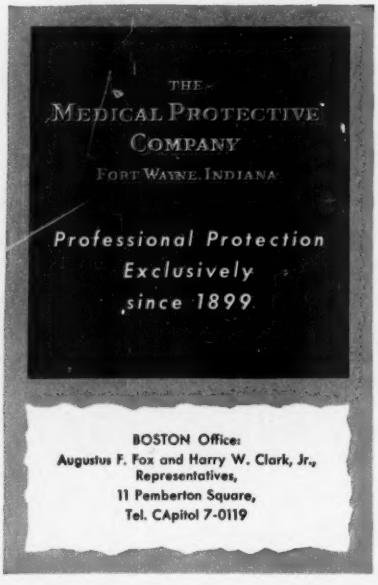
*11:00 a.m.–12:00 m. Medical Clinic, including Psychiatric Conferences. (Children's Medical Center.) Amphitheater, Children's Hospital.

*12:00 m. X-ray Conference. Margaret Jewett Hall, Mount Auburn Hospital, Cambridge.

*12:00 m.–1:00 p.m. Clinicopathological Conference. (Children's Medical Center.) Amphitheater, Peter Bent Brigham Hospital.

*2:00–3:00 p.m. Combined Clinic of all services. (Children's Medical Center.) Amphitheater, Children's Hospital.

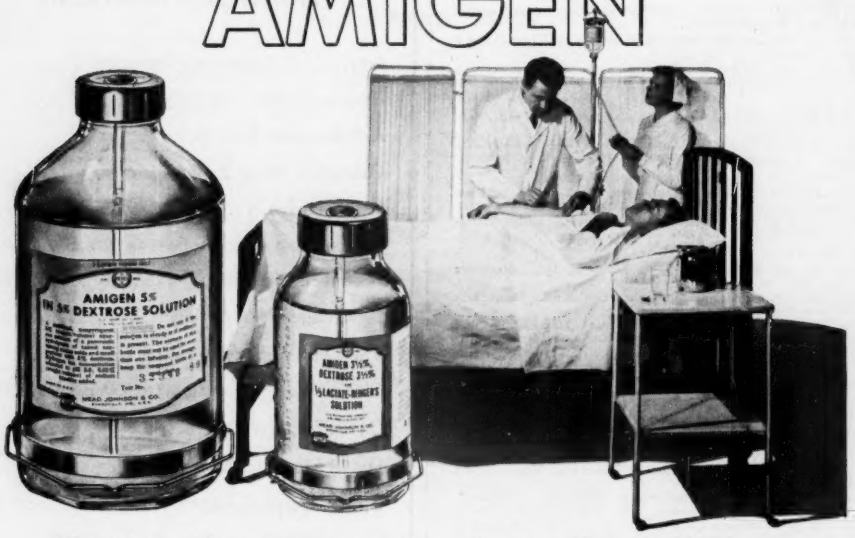
*Open to the medical profession.



Index to Advertisers

	PAGE
American Policyholders' Insurance Co.	ii
Atlantic X-Ray Company, Inc.	ii
A–Z Research Laboratory	viii
Chester A. Baker Laboratories, Inc.	vi
Baldpate, Inc.	x
Boston Diagnostic Clinic	vi
Boston Medical Supply Company	viii
Brown and Connolly, Inc.	ii
The Charles River Breeding Labs., Inc.	viii
Crane Discount Corporation	vi
Cutter Laboratories	viii
David Memorial Nursing Home	x
Electroencephalographic Laboratory, Inc.	viii
Glenside, Inc.	x
Hanover House, Inc.	x
Huntley Nursing Home	x
Lakeside Laboratories, Inc.	vii
Leary Laboratory	viii
Eli Lilly and Company	After viii
Mason Drug Company	ii
Mead Johnson and Company	Back Cover
The Medical Protective Company	xi
Perkins School	x
Charles Pfizer and Company, Inc.	iv, v
Picker X-Ray Corporation	ix
Ring Sanatorium	x
Sandoz Pharmaceuticals	vi
W. B. Saunders Company	Front Cover
The Wander Company	iii
Washingtonian Hospital	vi
Wiswall Sanatorium	x
Woodside Cottages, Inc.	x

AMIGEN



"Surgery has been made safe for the patient; we must now make the patient safe for surgery"

The above epigram, credited to a famous surgeon, emphasizes the necessity of achieving optimum nutrition in the surgical patient. Among the essential nutrients contributing to optimum nutrition, few equal protein. As a source of parenteral protein nourishment, solutions of Amigen, a casein hydrolysate, are effective, convenient, and economical.

Amigen holds a special place in the esteem of the medical profession. Rarely has a product received such wide recognition. Over 500 references to Amigen have appeared in medical and scientific literature.

Amigen provides all the amino acids needed for synthesis of tissue protein. By the use of Amigen, the physician can provide protein nutrients parenterally —when the patient cannot take food by mouth; when complete rest of the alimentary tract is desired; when parenteral supplementation of oral food intake is indicated.

On request, we will be pleased to send the Amigen Handbook for Physicians.

Mead Johnson & Company's Amiset features a *new air filter*, a *plastic dripmeter*, an *efficient tubing compressor*, and a *plastic needle adapter*. The Amiset is designed to save time and is efficient, convenient, and economical.

AMIGEN and AMISET are registered trademarks of Mead Johnson & Company

MEAD'S

MEAD JOHNSON & CO.
EVANSVILLE 21, IND., U. S. A.